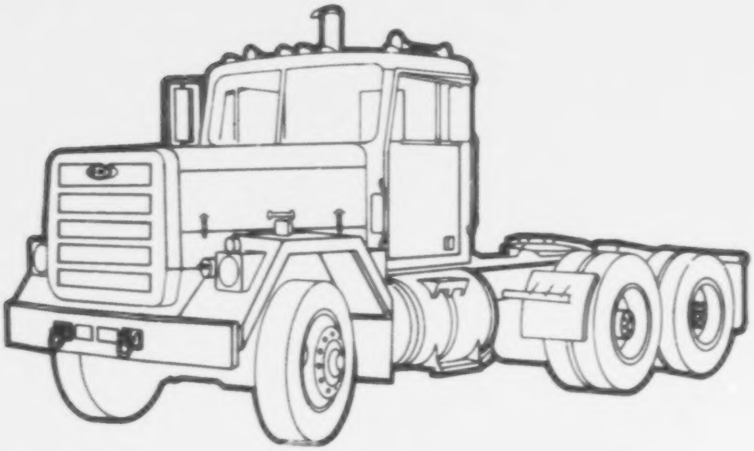
9-2320-273-20

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE

TRUCK TRACTOR, LINE HAUL,
50,000 GVWR, 6 X 4, M915 (NSN 2320-01-028-4395)
TRUCK TRACTOR, LIGHT EQUIPMENT TRANSPORTER
(LET), 56,000 GVWR, 6 X 6, W/WINCH
M916 (NSN 2320-01-028-4396)
TRUCK TRACTOR, MEDIUM EQUIPMENT TRANSPORTER
(MET), 75,000 GVWR, 8 X 6, W/WINCH
M920 (NSN 2320-01-028-4397)



TRUCK CHASSIS, 75,000 GVWR, 8 X 6,
FOR 20-TON DUMP TRUCK,
M917 (NSN 3805-01-028-4389)
TRUCK CHASSIS, 56,000 GVWR, 6 X 6,
FOR BITUMINOUS DISTRIBUTOR TRUCK,
M918 (NSN 3895-01-028-4390)
TRUCK CHASSIS, 75,000 GVWR, 8 X 6,
FOR CONCRETE-MOBILE® MIXER TRUCK,
M919 (NSN 3895-01-028-4391)

AM GENERAL CORPORATION

TA 075632

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1980

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NO. 2 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *18 June 1987*

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK TRACTOR, LINE HAUL, 50,000 GVWR, 6 X 4, M915 (NSN 2320-01-028-4395)

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To be distributed in accordance with DA Form 12-38, Organizational Maintenance requirements for M915, M916, M920 Trucks and Truck chassis for M917, M918, and M919.

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NO. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC. *18 February 1983*

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK TRACTOR, LINE HAUL, 50,000 GVWR, 6 X 4, M915 (NSN 2320-01-028-4395)

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	6-15 and 6-16	B-11 and B-12	B-11 and B-12, B-12.1

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WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, or coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in the exhaust fumes of fuel-burning internal combustion engines and can become dangerous under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel:

A. DO NOT operate the engine of a vehicle in an enclosed area unless it is ADEQUATELY VENTILATED.

B. DO NOT idle the engine for long periods without maintaining ADEQUATE VENTILATION in the personnel compartments.

C. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless it is necessary for maintenance purposes.

D. BE ALERT at all times during vehicle operation for exhaust odors, and exposure symptoms. If either are present, IMMEDIATELY VENTILATE the personnel compartments. If symptoms persist, remove affected personnel from the vehicle and treat as follows:

   (1) Exposure to fresh air.

   (2) Keep warm.

   (3) DO NOT PERMIT EXERCISE.

   (4) If necessary, administer artificial respiration (see FM 21-11).

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

COMPRESSED AIR

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

WINCH HYDRAULIC RESERVOIR (M916 AND M920)

Do not remove fill cap when hydraulic fluid is hot. The hydraulic tank is pressurized to 5 psi. Remove the fill cap slowly.

WARNING

COOLING FAN

When working in the engine compartment with the engine running, stay clear of the cooling fan. The fan may engage automatically at any time and could cause serious injury.

PUSHER AXLE (M917, M919,AND M920)

When the pusher axle is in the up position it freewheels. DO NOT USE THE PUSHER AXLE AS A STEP. You can fall and be injured. Always lower the pusher axle when the vehicle is parked.

FILLING THE RADIATOR

Let the radiator cool before removing cap. Remove radiator cap in two steps. First, place a thick cloth over the cap and slowly rotate cap left to its first stop; pause, and let pressure escape from cooling system. Then rotate cap farther left until you can remove it. Failure to follow this procedure can result in serious burns.

LIFTING THE TRUCK

Improper use of lifting equipment and attachment of cables to the truck can result in serious personnel injury and equipment damage. OBSERVE ALL STANDARD RULES OF SAFETY.

HOOD SAFETY LATCH

After raising hood, insert the S-shaped safety hook through two matching holes in the prop channels to prevent the hood from falling accidentally.

EXHAUST PIPE AND MUFFLER

During normal operation the exhaust pipe and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the pipe or muffler. Exhaust system components may be hot enough to cause serious burns.

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Technical Manual

No. 9-2320-273-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *28 November 1980*

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK TRACTOR, LINE HAUL, 50,000 GVWR, 6 X 4, M915 (NSN 2320-01-028-4395)

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REPORTING OF ERRORS

You can help improve this publication. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication and blank forms), or DA Form 2028-2 located in back of this Publication direct to: US Army Tank-Automotive Command, ATTN: DRSTA-MBP, Warren MI 48090. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

This manual contains the following information to help you understand how the truck/tractor works, how to service it, and how to make authorized repairs.

WHAT THIS MANUAL CONTAINS

This manual is divided into chapters which provide the following information:

CHAPTER 1 – INTRODUCTION

This chapter contains general information on different truck/tractor models covered in this manual. Included are illustrations showing the inside and outside of the vehicle.

CHAPTER 2 – PRINCIPALS OF OPERATION

This chapter contains information on how the vehicle works. It is divided into sections by function: fuel system, oil system, etc. (see Table of Contents for complete listing).

CHAPTER 3 – TRUCK/TRACTOR MAINTENANCE

This is the integrated maintenance chapter. It includes information that applies to all the maintenance chapters that follow (chapter 4 thru 11), including the following important information:

a. When to inspect, test, and service the vehicle. (Preventive Maintenance Checks and Services.)

b. How to find the best troubleshooting procedures for a specific problem. (Troubleshooting Symptom Index.)

CHAPTERS 4 THRU 12 – INDIVIDUAL MAINTENANCE CHAPTERS (See Table of Contents).

These chapters give you the following information:

a. How to find out what's causing a problem. (Troubleshooting Procedures.)

b. A list of authorized maintenance procedures. (Maintenance Task Summaries.)

c. Detailed procedures for replacing and servicing component parts (Task Procedures). Procedures include a list of special tools that you'll need (if any), materials required and references to other manuals, if needed.

This listing includes the nomenclature cross reference list and the list of abbreviations used in this manual.

A. NOMENCLATURE CROSS REFERENCE LIST

Common Name	Official Nomenclature
Air Cooler, Intercooler	Aftercooler
Drive Shaft	Propeller Shaft
Power Steering Cylinder	Auxiliary Assist Cylinder
Dual Control Valve, Treadle Valve	Dual Brake Valve
Crankcase Breather	Breather Tube
Antifreeze, Ethylene Glycol Mixture	Coolant
Power Transfer/Differential Lockup Control	Differential Lockup Control
Cold Start System	Ether Quick-Start System
Tail Pipe	Exhaust Stack
Float Switch	Fuel Level Sending Unit
Power Steering Pump, Power Steering Reservoir	Hydraulic Pump and Reservoir Assembly
Ratio Valve	Limiting Valve
Differential Lockout Engaged Switch	Lockout Switch
Splash Shields	Mud Flaps
Intermediate Pipe	Muffler Inlet Pipe
Brake Control Valve	Park Brake Valve
PTO Propeller Shaft U-Joint	PTO-to-Pump Coupling
Jacobs Brake Cover, Valve Cover, Cylinder Head Cover	Rocker Arm Housing Cover
Stowage Box	Seat Risers and Tool Box
Cross Tube	Tie Rod
Hand Control Valve for Trailer	Trailer Brake Valve
Exhaust Pipe	Turbo Outlet Pipe

B. LIST OF ABBREVIATIONS

amp	ampere
approx	approximate
attn	attention
cm	centimeter
cu ft	cubic foot/cubic feet
cu m	cubic meter
cu yd	cubic yard
DA	Department of the Army
dia	diameter
desc	description
fig	figure
GVWR	gross vehicle weight rating
gnd	ground
in.	inch
Kg	kilogram
kph	kilometers per hour
m	meter
MI	Michigan
mph	miles per hour
MTOE	Modified Table of Organization & Equipment
No.	number
NSN	National Stock Number
para	paragraph
PMCS	Preventive Maintenance Checks & Services
P/N	part number
psi	pounds per square inch
PTO	Power Takeoff
qt	quart
ref	reference
TM	technical manual
TMDE	Test, Measurement & Diagnostic Equipment
vert	vertical

Reporting Equipment Improvement Recommendations (EIR's).

EIR's can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. See TM 38-750. Mail EIR's directly to Commander, U.S. Army Tank Automotive Materiel Readiness Command, ATTN: DRSTA-MTC, Warren, Michigan, 48090. A reply will be furnished to you.

Equipment Improvement Report and Maintenance Digest (EIR MD) and Equipment Improvement Report and Maintenance Summary (EIR MS).

The quarterly Equipment Improvement Report and Maintenance Digest, TB 43-0001-39 series, contains valuable field information on the equipment covered in this manual. The information in the TB 43-0001-39 series is compiled from some of the Equipment Improvement Reports that you prepared on the vehicles covered in this manual. Many of these articles result from comments, suggestions, and improvement recommendations that you submitted to the EIR program. The TB 43-0001-39 series contains information on equipment improvements, minor alterations, proposed Modification Work Orders (MWO's), warranties (if applicable), actions taken on some of your DA Form 2028's (Recommended Changes to Publications), and advance information on proposed changes that may affect this manual. In addition, the more maintenance significant articles, including minor alterations, field-fixes, etc., that have a more permanent and continuing need in the field are republished in the Equipment Improvement Report and Maintenance Summary (EIR MS) for TARCOM Equipment (TM 43-0143). Refer to both of these publications (TB 43-0001-39 series and TM 43-0143) periodically, especially the TB 43-0001-39 series, for the most current and authoritative information on your equipment. The information will help you in doing your job better and will help in keeping you advised of the latest changes to this manual. Also refer to DA Pam 310-4, Index of Technical Publications, and Appendix A, References, of this manual.

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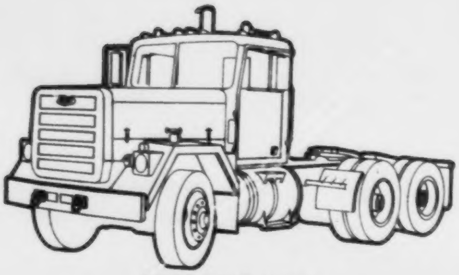
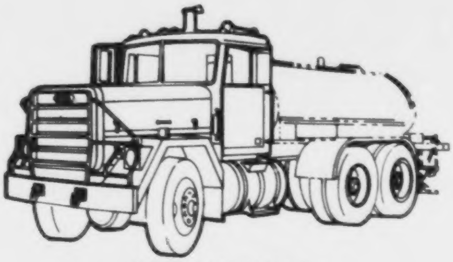
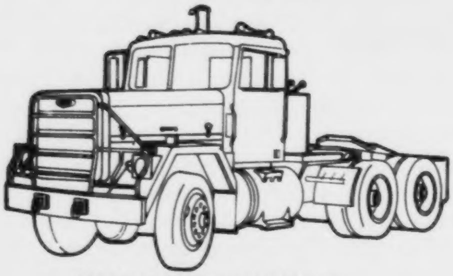


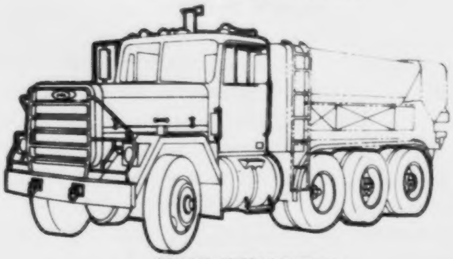
M915 LINE HAUL
TRUCK TRACTOR



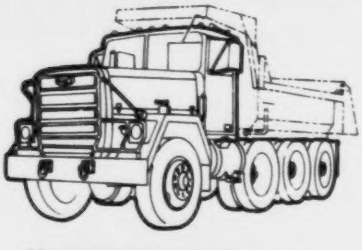
M918 BITUMINOUS
DISTRIBUTOR TRUCK



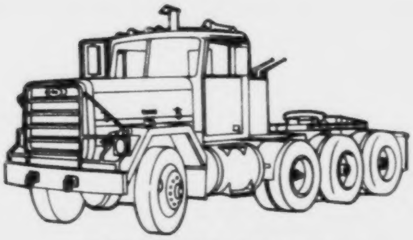
M916 LIGHT EQUIPMENT
TRANSPORTER TRUCK TRACTOR



M919 CONCRETE-
MOBILE® MIXER TRUCK



M917 20-TON DUMP TRUCK



M920 MEDIUM EQUIPMENT
TRANSPORTER TRUCK TRACTOR

TA 074553

Figure 1-1. M915 Series Vehicles

CHAPTER 1

INTRODUCTION

1-1. OVERVIEW.

This chapter provides you with the following information:

- *a.* Forms and record data required for maintenance.
- *b.* Physical description of each truck model and major equipment components.

Section I GENERAL INFORMATION

1-2. SCOPE.

Type of Manual: Organizational Maintenance.

Model Numbers and Equipment Names (fig. 1-1):

a.	M915	Line Haul Truck Tractor
b.	M916	Light Equipment Transporter Truck Tractor
c.	M917	20-Ton Dump Truck
d.	M918	Bituminous Distributor Truck
e.	M919	Concrete Mobile Mixer Truck
f.	M920	Medium Equipment Transporter Truck Tractor

Chassis Designations:

- *a.* Type I – Model M915
- *b.* Type II – Models M916 and M918
- *c.* Type III – Models M917, M919, and M920

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Requirements and procedures for destruction of Army materiel to prevent enemy use are given in TM 750-244-6.

1-5. ADMINISTRATIVE STORAGE.

Storage information is given in TM 740-90-1, Administrative Storage.

Section II EQUIPMENT DESCRIPTION AND DATA

1-6. PURPOSE OF EQUIPMENT.

Model M915.	Used for on-road line hauling of loads up to a gross vehicle weight rating of 50,000 lbs (22,680 Kg), 30,000 lbs (13,608 Kg) on fifth wheel.
Model M916.	Used for transporting light equipment, both on and off the road, up to a gross vehicle weight rating of 56,000 lbs (25,402 Kg), 28,000 lbs (12,700 Kg) on fifth wheel.
Model M917.	A heavy-duty, 20-ton dump truck used to haul aggregate and similar materials. Capable of operating both on and off the road, up to a gross vehicle weight rating of 75,000 lbs. Hauls 15.2 cu yds (11.62 cu m) heaped, and 19.6 cu yds (14.98 cu m) with 12 inch sideboards.
Model M918.	Used with a mounted bituminous distributor to spread 375 gallons (1,419.52 liters) of bitumen per minute at a road speed of 1.5 miles per hour (2.41 K/H).
Model M919.	Used with a mounted concrete mixer to mix and spread concrete at a maximum rate of 40 cu ft per minute. Can transport sufficient cement, sand, coarse aggregate and water to mix 8 cu yds (6.12 cu m) on-site.
Model M920.	Used to transport medium equipment both on and off the road, up to a gross vehicle rating of 75,000 lbs (34,020 Kg), 40,000 lbs (18,144 Kg) on fifth wheel.

1-7. CAPABILITIES AND FEATURES.

a. Interchangeable frame components (Exception: Frames for Types II and III chassis have an added 3/8-inch outer channel.)

b. Commercial-type replacement parts for entire vehicle, available through national network of dealers and vendors.

c. Commercial operating components that require no special maintenance procedures and a minimum of special tools:

(1) Six-cylinder, in-line, four-stroke, four-cycle turbocharged diesel engine.

(2) Semi-automatic, centrifugal clutch transmission with 16 forward and 2 reverse speeds.

(3) Transfer case for front wheel drive (M916 thru M920).

(4) Pusher axle for weight distribution (M917, M919, and M920).

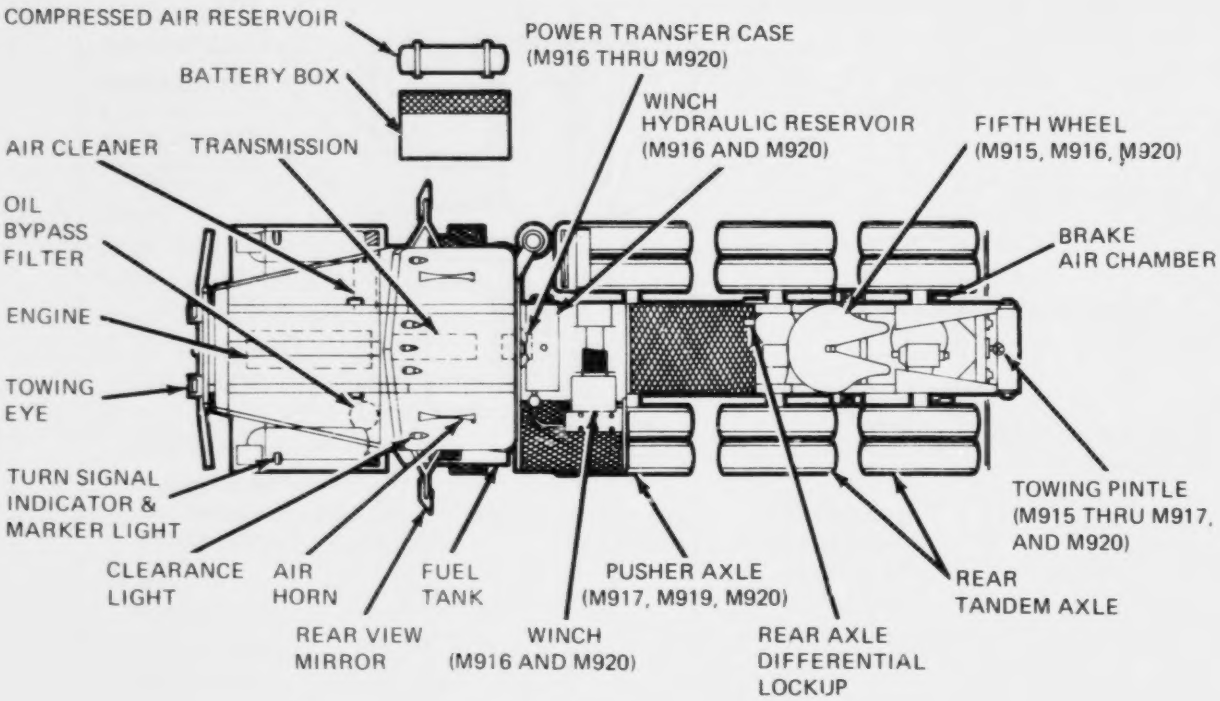
(5) Rear tandem axle.

(6) Power Takeoff (PTO) for power to drive accessories (M916 thru M920).

(7) Winch (M916 and M920).

1-8. LOCATION OF MAJOR EXTERIOR COMPONENTS.

The illustration below identifies the major exterior components located on one or more models of M915 thru M920 vehicles. See table 1-1, Differences Between Models for model configuration differences and a reference to detailed information. Also see the Operator's Manual TM 9-2320-273-10.


COMPRESSED AIR RESERVOIR
BATTERY BOX
POWER TRANSFER CASE (M916 THRU M920)
WINCH HYDRAULIC RESERVOIR (M916 AND M920)
FIFTH WHEEL (M915, M916, M920)
AIR CLEANER
TRANSMISSION
OIL BYPASS FILTER
BRAKE AIR CHAMBER
ENGINE
TOWING EYE
TURN SIGNAL INDICATOR & MARKER LIGHT
TOWING PINTLE (M915 THRU M917, AND M920)
CLEARANCE LIGHT
AIR HORN
FUEL TANK
PUSHER AXLE (M917, M919, M920)
REAR TANDEM AXLE
REAR VIEW MIRROR
WINCH (M916 AND M920)
REAR AXLE DIFFERENTIAL LOCKUP

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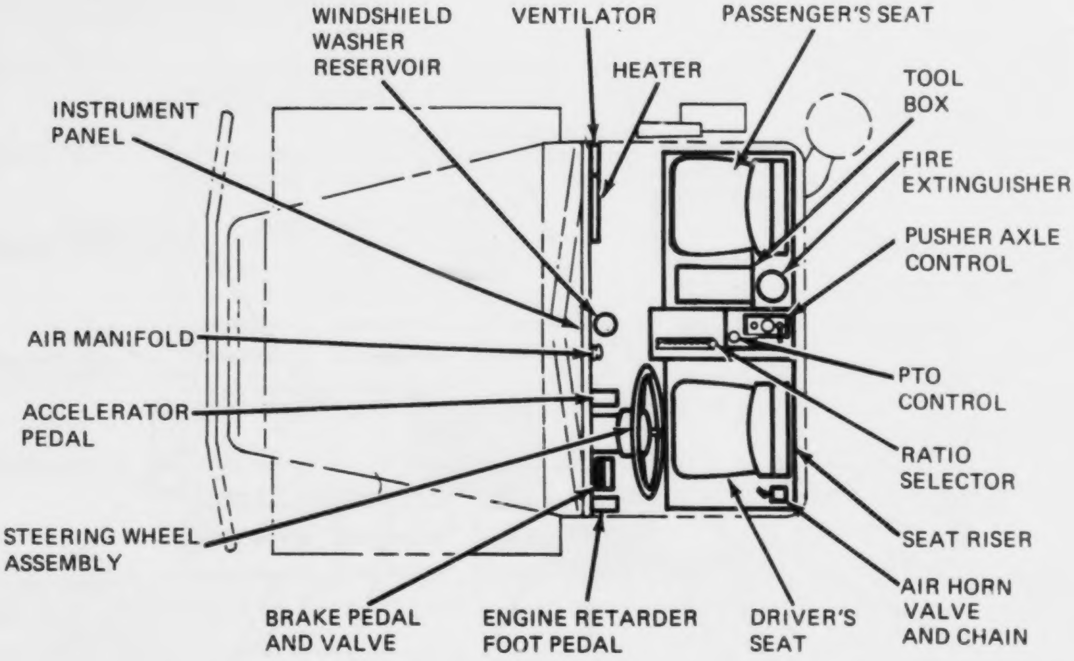
1-9. LOCATION OF MAJOR INTERIOR COMPONENTS.

The illustration below identifies the major interior components located on the M915 thru M920 vehicles. No identification plates, instruction plates, warranty plates, modification plates or stencils are applicable to organizational maintenance.


WINDSHIELD WASHER RESERVOIR
VENTILATOR
PASSENGER'S SEAT
HEATER
TOOL BOX
INSTRUMENT PANEL
FIRE EXTINGUISHER
PUSHER AXLE CONTROL
AIR MANIFOLD
PTO CONTROL
ACCELERATOR PEDAL
RATIO SELECTOR
SEAT RISER
STEERING WHEEL ASSEMBLY
AIR HORN VALVE AND CHAIN
BRAKE PEDAL AND VALVE
ENGINE RETARDER FOOT PEDAL
DRIVER'S SEAT

1-10. DIFFERENCES BETWEEN MODELS.

The major equipment and functional differences between models are given in table 1-1. For illustrations and descriptions, refer to the following:

a. Illustration of each model (fig. 1-1).

b. Purpose of each model (para 1-6).

c. Differences between models (table 1-1).

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Table 1-1. Differences Between Models.

EQUIPMENT/FUNCTION	VEHICLE MODEL						DESC/REF (PARA)
	M915	M916	M917	M918	M919	M920	
Type I Chassis.	X						1-2
Type II Chassis.		X		X			1-2
Type III Chassis.			X		X	X	1-2
Transfer Case.		X	X	X	X	X	2-14
Pusher Axle.			X		X	X	2-16
Driving Front Axle.		X	X	X	X	X	2-19
Spare Tire and Wheel Assembly.	X	X					10-11,10-12
Hoist for Spare.	X	X				X	–
Towing Pintle.	X	X	X			X	–
Fifth Wheel.	X	X				X	11-13
Spacer Kit for Fifth Wheel.		X				X	
Winch.		X				X	2-80
Work Lamps – Stationary.		X				X	2-48
Work Lamps – Portable.	X	X				X	5-54
Power Takeoff (PTO).		X	X	X	X	X	2-78
Hose Tender and Cable Support.	X	X				X	–
Backup Alarm.		X	X	X	X	X	–
Double Rail Frame.		X	X	X	X	X	
Front Shock Absorbers.	X						
No-Spin Differential (1)	X						
(2)		X	X	X	X	X	
Tires:							
Highway.	X						
On/Off Road.		X	X	X	X	X	
Special Bodies:							
Dump Body.			X				
Bituminous Distributor.				X			
Concrete-Mobile® Mixer.					X		
Auxiliary Power Steering Cylinder.		X	X	X	X	X	
Sliding Rear Window.		X				X	
Front and Rear Air Connections.	X	X				X	
Tail Roller.						X	
24V Receptacle.	X	X	X			X	

1-11. EQUIPMENT DATA.

MODEL M915 TRUCK TRACTOR

OVERALL CHARACTERISTICS:	ENGLISH	METRIC
National Stock Number:	2320-01-028-4395	
Curb Weight:	19,630 lbs	8781 Kg
Axle Loads (Empty):		
Front Axle:	9,920 lbs	4,500 Kg
Rear Axle:	9,710 lbs	4,405 Kg
Axle Loads (with 30,000 lbs (13,608 Kg) 5th Wheel Load):		
Front Axle:	11,055 lbs	5,015 Kg
Rear Tandem:	37,660 lbs	17,083 Kg
Gross Vehicle Weight:	48,715 lbs	22,097 Kg
Gross Axle Weight Rating:		
Front Axle:	12,000 lbs	5,443 Kg
Rear Tandem:	38,000 lbs	17,236 Kg
Gross Vehicle Weight Rating:	55,000 lbs	24,941 Kg
Towed Load (M872 Trailer – 30,000 lbs (13,608 Kg) on the King Pin):	86,170 lbs	39,121 Kg
Gross Combination Weight Rating:	105,000 lbs	47,627 Kg
DIMENSIONAL DATA:		
Overall Length (Less Pintle Hook and Lifting Shackle):	268.50 in.	6.82 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	114.63 in.	2.91 m
Overall Height (Over Stack-Empty):	134.63 in.	3.42 m
Cab to Axle:	86 in.	2.18 m
Bumper to Back of Cab:	119 in.	3.02 m
Bumper to Front Axle:	37.5 in.	.95 m
Wheel Base:	168.25 in.	4.30 m
Shipping Cube, Minimum:	1,674 cu ft	47.40 cu m
Tandem Axle Spacing:	52 in.	1.32 m
Tread Width:		
Front:	78.40 in.	1.99 m
Rear:	71.57 in.	1.82 m
Dual Tire Spacing:	13.75 in.	.35 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M-872 Trailer:	54.92 ft	16.74 m
Angle of Approach (Loaded):	38°	38°
Minimum Turning diameter, Curb to Curb:	53.50 ft	16.31 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	10.25 in.	.26 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2,100 rpm – 16th Gear):	66.60 mph	107.16 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	17%	17%
Minimum Sustained Speed (At 1,300 rpm):	2.31 mph	3.72 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	25,028 lbs	11,262 Kg
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).

MODEL M916 TRUCK TRACTOR

OVERALL CHARACTERISTICS:	ENGLISH	METRIC
National Stock Number:	2320-01-028-4396	
Curb Weight:	27,500 lbs	12,474 Kg
Axle Loads (Empty):		
Front Axle :	13,370 lbs	6,065 Kg
Rear Axle:	14,130 lbs	6,409 Kg
Axle Loads (with 25,588 lbs (11,606 Kg) 5th Wheel Load):		
Front Axle:	14,570 lbs	6,609 Kg
Rear Tandem:	40,930 lbs	18,566 Kg
Gross Vehicle Weight:	55,500 lbs	25,174 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Gross Vehicle Weight Rating:	56,000 lbs	25,402 Kg
Towed Load (M172A1 Trailer – 25,588 lbs (11,606 Kg) on the King Pin):	78,500 lbs	35,639 Kg
Gross Combination Weight Rating:	106,000 lbs	48,082 Kg

DIMENSIONAL DATA:

Overall Length (Less Pintle Hook and Lifting Shackle):	294.30 in.	7.48 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128.00 in.	3.25 m
Overall Height (Over Stack – Empty):	142.00 in.	3.61 m
Cab to Axle:	105 in.	2.67 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	186 in.	4.72 m
Shipping Cube, Minimum:	2,212 cu ft	62.64 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Rear:	72.70 in.	1.85 m
Dual Tire Spacing:	13.75 in.	.349 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M172A1 Trailer:	58.66 ft	17.88 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	80 ft	24.40 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m

PERFORMANCE:

Maximum Speed (Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	47,725 lbs	20,576 Kg
Maximum Side Slope (W/Adequate Tractive Surfaces):	10%	10%

1-11. EQUIPMENT DATA (Continued).

MODEL M917 DUMP TRUCK CHASSIS

OVERALL CHARACTERISTICS :	ENGLISH	METRIC
National Stock Number:	3805-01-028-4389	
Curb Weight:	34,080 lbs	15,459 Kg
Axle Loads (Empty):		
Front Axle:	18,670 lbs	8,469 Kg
Rear Axle:	15,360 lbs	6,967 Kg
Axle Loads (with 40,000 lbs (18,144 kg) Payload):		
Front Axle:	10,980 lbs	4,890 Kg
Rear Tandem:	44,200 lbs	20,049 Kg
Pusher Axle:	20,000 lbs	9,072 Kg
Gross Vehicle Weight:	74,980 lbs	34,011 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
DIMENSIONAL DATA:		
Overall Length (Less Pintle Hook and Lifting Shackle):	350.60 in.	8.90 m
Overall Width (Body):	96.75 in.	2.46 m
Overall Height (Over Cab Protector):	141 in.	3.60 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,804 cu ft	79.40 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.95 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacing (6.88 in. (.17 m) between each dual):	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	12 in.	.30 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).

MODEL M918 BITUMINOUS DISTRIBUTOR TRUCK CHASSIS

OVERALL CHARACTERISTICS:	**ENGLISH**	**METRIC**
National Stock Number:	3895-01-028-4390	
Curb Weight:	30,280 lbs	13,735 Kg
Axle Loads (Empty):		
Front Axle:	11,980 lbs	5,434 Kg
Rear Axle:	19,300 lbs	8,754 Kg
Axle Loads (with 13,483 lbs (6,116 Kg) Payload):		
Front Axle:	12,520 lbs	5,679 Kg
Rear Tandem:	30,760 lbs	13,953 Kg
Gross Vehicle Weight:	43,280 lbs	19,632 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Gross Vehicle Weight Rating:	56,000 lbs	25,402 Kg
DIMENSIONAL DATA:		
Overall Length:	350.60 in.	8.90 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142.0 in.	3.61 m
Cab to Axle:	105 in.	2.67 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	186 in.	4.72 m
Shipping Cube, Minimum:	2,544 cu ft	72.04 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Thread Width:		
Front:	77.90 in.	1.98 m
Rear:	72.70 in.	1.85 m
Dual Tire Spacing:	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	80 ft	24.40 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).

MODEL M919 CONCRETE MOBILE MIXER TRUCK CHASSIS

OVERALL CHARACTERISTICS:	**ENGLISH**	**METRIC**
National Stock Number:	3895-01-028-4391	
Curb Weight:	37,540 lbs	17,028 Kg
Axle Loads (Empty):		
Front Axle:	14,280 lbs	6,477 Kg
Rear Axle:	23,260 lbs	10,551 Kg
Axle Loads (with 36,500 lbs (16,556 Kg) Payload):		
Front Axle:	9,210 lbs	4,178 Kg
Rear Tandem:	43,880 lbs	19,904 Kg
Pusher Axle:	20,000 lbs	9,072 Kg
Gross Vehicle Weight:	73,090 lbs	33,154 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
DIMENSIONAL DATA:		
Overall Length:	374.40 in.	9.51 m
Overall width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142.0 in.	3.61 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,716 cu ft	76.91 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.85 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacking (6.88 in. (.17 m) between each dual):	13.75 in.	.35 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	12 in.	.30 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Speed of 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).

MODEL M920 TRUCK TRACTOR

OVERALL CHARACTERISTICS:	ENGLISH	METRIC
National Stock Number:	2320-01-028-4397	
Curb Weight:	30,270 lbs	13,730 Kg
Axle Loads (Empty):		
Front Axle:	14,700 lbs	6,668 Kg
Rear Axle:	15,570 lbs	7,063 Kg
Axle Loads (with 40,000 lbs (18,144 Kg) 5th Wheel Load):		
Front Axle:	8,870 lbs	4,023 Kg
Rear Tandem:	46,010 lbs	20,870 Kg
Pusher Axle:	30,000 lbs	9,072 Kg
Gross Vehicle Weight:	74,880 lbs	33,965 Kg
Gross Axle Weight Rating:		
Front Axle:	14,860 lbs	6,740 Kg
Rear Tandem:	52,160 lbs	23,659 Kg
Pusher:	20,000 lbs	9,072 Kg
Gross Vehicle Weight Rating:	75,000 lbs	34,019 Kg
Towed Load (M-870 Trailer – 40,000 lbs (18,144 Kg) on the King Pin):	99,730 lbs	45,277 Kg
Gross Combination Weight Rating:	130,000 lbs	58,968 Kg
DIMENSIONAL DATA:		
Overall Length:	319.30 in.	8.11 m
Overall Width (Body):	96.75 in.	2.46 m
Height (Over Horns – Empty):	128 in.	3.25 m
Overall Height (Over Stack – Empty):	142 in.	3.61 m
Cab to Axle:	130 in.	3.30 m
Bumper to Back of Cab:	124 in.	3.15 m
Bumper to Front Axle:	43 in.	1.09 m
Wheel Base:	211 in.	5.36 m
Shipping Cube, Minimum:	2,317 cu ft	65.61 cu m
Tandem Axle Spacing:	56 in.	1.42 m
Tread Width:		
Front:	77.90 in.	1.98 m
Pusher:	72.70 in.	1.85 m
Rear:	72.70 in.	1.85 m
Pusher Axle to Rear Tandem Forward Axle:	54 in.	1.37 m
Dual Tire Spacing (6.88 in. (.17 m) Between each Dual):	13.75 in.	.35 m
Fifth Wheel to Rear Tandem:	8 in.	.20 m
Overall Length with M-870 Trailer:	60.75 ft	18.52 m
Angle of Approach (Loaded):	42°	42°
Minimum Turning Diameter, Curb to Curb:	89.50 ft	27.30 m
Minimum Ground Clearance (Under Rear Walking Beam Bracket, Empty):	11.62 in.	.29 m
Fording Depth, Maximum:	20 in.	.51 m
PERFORMANCE:		
Maximum Speed Forward (At 2100 rpm – 16th Gear):	59 mph	94.93 kph
Maximum Speed on 3.9% Grade:	25 mph	40.22 kph
Maximum Grade (At GCWR):	25%	25%
Minimum Sustained Speed (At 1300 rpm):	2.23 mph	3.59 kph
Maximum Drawbar Pull @ 0.7 Coefficient:	47,403 lbs	21,501 Kg
Maximum Side Slope (W/Adequate Tractive Surface):	10%	10%

1-11. EQUIPMENT DATA (Continued).

CAB (ALL MODELS)	
Make:	AM General.
Type:	2-passenger, all-steel with butterfly hood.
ENGINE (ALL MODELS)	
Make/Model/Type:	Cummins Diesel/NTC-400/6-cylinder, 4 cycle.
Displacement:	855 cu in. (14 liters).
Compression Ratio:	13.5:1.
Horsepower – Gross:	400 @ 2100 rpm (298 Kw @ 2100 RPM).
Torque – Gross:	1150 lb-ft @ 1500 RPM (1559 N·m @ 1500 RPM).
Lube Capacity:	46 qts (43.5 liters).
Coolant Capacity:	17.25 gal (65.3 liters).
Governed Speed:	2100 rpm.
Retarder (Integral with Engine):	
Make/Model:	Jacobs/130
TRANSMISSION (ALL MODELS)	
Make/Model/Type:	Caterpillar/D7155/Semi-Automatic
Number of Gears:	16 Forward, 2 Reverse.
Ratios: 1st	14.77
2nd	12.21
3rd	10.07
4th	8.33
5th	6.89
6th	5.70
7th	4.70
8th	3.89
9th	3.14
10th	2.60
11th	2.14
12th	1.77
13th	1.47
14th	1.21
15th	1.00
16th	.83
Reverse	14.77
Reverse	8.33
Shift: Remote – Air Control – Power Shift	
Lube Capacity:	5.5 gal (20.8 liters).
Weight, Net Dry (Approx) Including Control:	1,090 lbs (494.86 Kg).

1-11. EQUIPMENT DATA (Continued).

TRANSFER CASE (MODELS M916 THROUGH M920)

Make/Model:	Oshkosh/1,800 series F-U29.
Ratio:	1:1.
Torque Capacity:	15,155 lb-ft (20,550 N-m).
Torque Proportioning – Front/Rear:	1:1 When Engaged.
Lock-Up – Front Axle:	Air Operated.
Lube Capacity:	5 qts (4.48 liters).

AXLES (MODEL M915)

Front:	
Make/Model/Type:	Rockwell/F-F931/I-Beam.
Rated Capacity:	12,000 lbs (5448 Kg).
Steer Angle:	32°.
Rear Tandem:	
Make/Model:	Rockwell/SQHP.
Ratio:	4.44:1.
Rated Capacity (Tandem):	38,000 lbs (17,252 Kg).
Inter-Axle Differential:	Bevel Gear.
Lock-Up:	Air Control.
Axle Differential – Forward/Rear Make/Type:	Detroit Automotive/No-Spin.
Axle Differential – Rear/Rear Make/Type:	Rockwell/Bevel Gear.
Lubrication:	Pressure.
Lube Capacity – Forward/Rear:	40/36 pts (19/17 liters).

AXLES (MODELS M916 AND M918)

Front:	
Make/Model/Type:	Rockwell/FDS/1807/Hypoid.
Ratio:	6.17:1.
Rated Capacity:	20,000 lbs (9,080 Kg).
Steer Angle:	28°.
Rear Tandem:	
Make/Type:	Rockwell/SUHD
Ratio:	6.17:1.
Rated Capacity (Tandem):	58,000 lbs (26,332 Kg).
Inter-Axle Differential:	Bevel Gear.
Lock-Up:	Air Operated.
Axle Differential Make/Type:	Detroit Automotive/No-Spin.
Lubrication:	Pressure.
Lube Capacity – Forward/Rear:	34/28 pts (16/13.2 liters).

1-11. EQUIPMENT DATA (Continued).

AXLES (MODELS M917, M919, AND M920)	
Front:	
Make/Type/Model:	Rockwell/Hypoid FDS-1807.
Ratio:	6.17:1.
Rated Capacity:	20,000 lbs (9,080 Kg).
Steer Angle:	28 degrees.
Pusher: Type:	Rockwell/Granning.
Rated Capacity:	20,000 lbs (9,080 Kg).
Singles/Duals:	Duals.
Rear Tandem:	
Make/Model:	Rockwell/SUHD.
Ratio:	6.17:1.
Rated Capacity (Tandem):	58,000 lbs (26,332 Kg).
Inter-Axle Differential:	Bevel Gear.
Lock-Up:	Air Operated.
Axle Differential Make/Type:	Detroit Automotive/No-Spin.
Lubrication:	Pressure.
Lube Capacity – Forward/Rear:	34/28 pts (16.08/13.25 liters).

SUSPENSION (MODEL M915)	
Front:	
Make/Type:	Rockwell/Asymmetrical Leaf Pin & Shackle.
Rate:	1,861 lbs/in. (332.3 Kg/cm).
Static Deflection:	2.73 in. (6.93 cm).
Rear Tandem:	
Make/Model/Type:	Hendrickson/RTE 380/Walking Beam-Steel Leaf.
Static Deflection:	.97 in. (2.46 cm).

SUSPENSION (MODEL M916)	
Front:	
Make/Type:	Rockwell/Asymmetrical Leaf Pin & Shackle.
Rate:	3,245 lbs/in. (580 Kg/cm).
Static Deflection:	1.94 in. (4.93 cm).
Rear Tandem:	
Make/Model/Type:	Hendrickson/RT 450/Walking Beam-Steel Leaf.
Static Deflection:	2.85 in. (7.24 cm).

1-11. EQUIPMENT DATA (Continued).

SUSPENSION (MODEL M917)

Front:	
Make/Type:	Rockwell/Asymmetrical Leaf Pin & Shackle.
Rate:	3,245 lbs/in. (580 Kg/cm).
Static Deflection:	2.11 in. (5.36 cm).
Pusher:	
Make/Model/Type:	Granning/T-500 AP/Trailing Arm Non-Linear (503 lbs/in.) (85.2 Kg/cm).
Raising System:	External Positive Pneumatic.
Rear Tandem:	
Make/Model/Type:	Hendrickson/RT 450/Walking Beam-Steel Leaf.
Static Deflection:	2.38 in. (6.04 cm).

SUSPENSION (MODEL M918)

Front:	
Make/Type:	Rockwell/Asymmetrical Leaf Pin & Shackle.
Rate:	3,245 lbs/in. (580 Kg/cm).
Static Deflection:	2.26 in. (5.74 cm).
Rear Tandem:	
Make/Model/Type:	Hendrickson/RT 450/Walking Beam-Steel Leaf.
Static Deflection:	4.6 in. (11.68 cm).

SUSPENSION (MODELS M919 AND M920)

Front:	
Make/Type:	Rockwell/Asymmetrical Leaf Pin & Shackle.
Rate:	3,245 lbs/in. (980 Kg/cm).
Static Deflection:	2.11 in. (5.36 cm).
Pusher:	
Make/Model/Type:	Granning/T-500 AP/Trailing Arm Non-Linear (503 lbs/in.) (85.2 Kg/cm).
Raising System:	External Positive Pneumatic.
Rear Tandem:	
Make/Model/Type:	Hendrickson/RT 450/Walking Beam-Steel Leaf.
Static Deflection:	2.00 in. (5.08 cm).

WHEELS (MODEL M915)

All Positions – Make/Model:	Budd/47890-3.
Size – Dia x Rim Width:	20.00 x 8 in. (508 x 203 mm).
Number of Studs/Bolt Circle:	10/11.25 in. (10/28.6 cm).
Stud Size:	1.125 in. Grade 8 (2.86 cm).
Offset/Dual Spacing:	6.88/13.75 in. (17.5/35 cm).
Rated Capacity:	7,280 lbs (3,305 Kg).

1-11. EQUIPMENT DATA (Continued).

WHEELS (MODELS M916 AND M918)	
All Positions – Make/Model:	Budd/R49210.
Size – Dia x Rim Width:	24.00 x 8 in. (610 x 203 mm).
Number of Studs/Bolt Circle:	10/11.25 in. (10/28.6 cm).
Stud Size:	1.125 in. Grade 8 (2.86 cm).
Offset/Dual Spacing:	6.88/13.75 in. (17.5/35 cm).
Rated Capacity:	7,430 lbs (3,373 Kg).

WHEELS (MODELS M917, M919 AND M920)	
All Positions – Make/Model:	Budd/R49210.
Size – Dia x Rim Width:	24.00 x 8 in. (610 x 203 mm).
Number of Studs/Bolt Circle:	10/11.25 in. (10/28.6 cm).
Stud Size:	1.125 in. Grade 8 (2.86 cm).
Offset/Dual Spacing:	6.88/13.75 in. (17.5/35 cm).
Rated Capacity:	7,430 lbs (3.373 Kg).

TIRES (MODEL M915)	
All Positions – Make/Model:	
Size:	10.00 x 20 in. (254 x 508 mm).
Type:	Bias Ply – On-Highway.
Load Range/Ply Rating:	G/14.
Static Loaded Radius:	19.6 in. (49.8 cm).
Rated Capacity – Single/Dual:	6,040/5,300 lbs (2742/2406 Kg).

TIRES (MODELS M916 THROUGH M920)	
All Positions – Make/Model:	
Size:	11.00 x 24 in. (279 x 610 cm).
Type:	Bias Ply – On/Off Highway.
Load Range/Ply Rating:	G/14.
Static Loaded Radius:	22.5 in. (57.1 cm).
Rated Capacity – Single/Dual:	7,430/6,520 lbs (3,373/2,9360 Kg).

1-11. EQUIPMENT DATA (Continued).

BRAKES (MODELS M917, M918, AND M920)

Service:	Rockwell – Air Actuated
Front Axle:	16 sq in. (Actuator) – Wedge
Dia x Width:	17 x 6 in. (48.18 x 15.24 cm).
Pusher Axle:	36 sq in. (Actuator) – "S" Cam
Dia x Width:	16.5 x 7 in. (47.72 x 17.78 cm).
Rear Tandem:	30 sq in. (Actuator) – "S" Cam
Dia x Width:	16.5 x 7 in. (41.91 x 17.78 cm)
Parking:	
Type:	Spring Chamber
Location:	Rear Tandems
Actuation:	Air Exhaust

FIFTH WHEEL (MODEL M915)

Make/Model:	Holland/3600-102-LH
Type:	36 in. (91.4 cm) Dia – Single Oscillating
Rated Capacity:	40,000 lbs (18,160 Kg) Vert
	150,000 lbs (68,100 Kg) Drawbar
King Pin Size:	2.0 in. (5.08 cm)
Pitch – Forward/Aft:	15/10°

FIFTH WHEEL (MODELS M916 AND M920)

Make/Model:	Holland/FW-70-0-15
Type:	36 in. (91.4 cm) Dia – Single Oscillating
Rated Capacity:	70,000 lbs (31,780 Kg) Vert
	200,000 lbs (90,800 Kg) Drawbar
King Pin Size:	3.5 in. (8.9 cm)
Pitch – Forward/Aft:	15/19°

PINTLE (MODELS M915, M916, M917 AND M920)

Make/Type:	Holland/NO. 760
Rated Capacity:	30 ton (27.2 metric ton)

1-11. EQUIPMENT DATA (Continued).

STEERING (MODELS M915 THROUGH M920)	
Gear – Make/Type:	Ross/Integral Power
Model:	HFB-70033
Ratio:	23.4:1
Auxiliary Cylinder Make/Model:	Ross/C44538
Piston Diameter:	2.80 in. (7.11 cm)
Wheel:	Sheller Globe
Diameter:	20 in. (50.8 cm)
Pump Make/Type:	Eaton/Gear Driven
Model:	ERS-15867-1
Flow Rates:	3.35 GPM (12.68 liters min) @ 600 RPM + 1200 psi 7.0/8.0 GPM (26.49/30.28 liters) @ 3000 RPM + 50 psi

BRAKES (MODEL M915)	
Make/Type:	
Service:	Rockwell – Air Actuated
Front Axle:	9 sq in. (Actuator) – Wedge
Dia x Width:	15 x 5 in. (38.1 x 12.7 cm)
Rear Tandem:	30 sq in. (Actuator) – "S" Cam
Dia x Width:	16.5 x 7 in. (41.9 x 17.8 cm)
Parking:	
Make/Type:	Anchorlock – Spring Chamber
Location:	Rear Tandems
Actuation:	Air Exhaust

BRAKES (MODELS M916 AND M918)	
Service:	Rockwell – Air Actuated
Front Axle:	16 sq in. (Actuator) – Wedge
Dia x Width:	17 x 6 in. (43.2 x 15.2 cm)
Rear Tandem:	30 sq in. (Actuator) – "S" Cam
Dia x Width:	16.5 x 7 in. (41.9 x 17.8 cm)
Parking:	
Make/Model:	Anchorlock Spring Chamber
Location:	Rear Tandems
Actuation:	Air Exhaust

1-11. EQUIPMENT DATA (Continued).

FRAME (MODEL M915)	
Type:	Steel-Heat Treat-Bolted- 110,000 psi (758,450 kPa)
Channel Section:	10.625 in. x 3.25 in. x .38 in. (28.99 cm x 8.25 cm x .7 cm)
Section Modulus:	17.7 cu in. (290 cm^3)
Overall Width:	34 in. (86.4 cm)
FRAME (MODELS M916 THROUGH M920)	
Type:	Steel-Heat Treated-Bolted- 110,000 psi (758,450 kPa)
Channel Section:	10.625 in. x 3.25 in. x .38 in. (28.99 cm x 8.25 cm x .7 cm)
Auxiliary Section (Wrapper):	11.50 in. x 3.625 in. x .38 in.
Section Modulus:	38.04 cu in. (623.36 cm^3)
Overall Width:	34 in. (86.4 cm)
WINCH (MODELS M916 AND M920)	
Make/Model:	DPMFG/4045
Type:	Hydraulic Planetary
Capacity:	45,000 lbs (20411.64 Kg)
ELECTRICAL SYSTEM (ALL MODELS)	
Type:	Basic 12V-w/24V Starting
Batteries Make/Model/Type:	Delco Remy/1200 Series/ Maintenance Free
Number/Volts:	4/12V
Alternator Make/Model:	Leece-Neville/2500JB
Volts/Amps:	12/24V/85 Amps
Starter:	
Make/Model:	Leece-Neville/7406 MA Series
Volts:	24V

CHAPTER 2

PRINCIPLES OF OPERATION

2-1. OVERVIEW.

This chapter explains the functioning of chassis components you will be maintaining at the Organizational level, and how these components relate to each other. The explanation is broken down into the following sections:

a. Truck/Tractor Chassis (para 2-2 thru 2-5).
b. Engine (para 2-6, 2-7).
c. Engine Controls (para 2-8 thru 2-10).
d. Transmission and Controls (para 2-11, 2-12).
e. Power Transfer Case and Rear Axle Differential Lockup (para 2-13, 2-14).
f. Pusher Axle and Controls (para 2-15, 2-16).
g. Front Axle and Suspension (para 2-17 thru 2-19).
h. Rear Axle (para 2-20 thru 2-22).
i. Fuel and Air Intake System (para 2-23 thru 2-25).
j. Engine Oil System (para 2-26 thru 2-28).
k. Exhaust System (para 2-29, 2-30).
l. Cooling System (para 2-31 thru 2-33).
m. Relays, Circuit Breakers, and Wire Identification (para 2-34 thru 2-36).
n. Starting and Starting Control System (para 2-37, 2-38).
o. Ether Quick-Start (para 2-39, 2-40).
p. Batteries and Power Generating System (para 2-41, 2-42).
q. Service Lighting System (para 2-43 thru 2-49).
r. Blackout Lighting System (para 2-50, 2-51).
s. Instrumentation (para 2-52).
t. Electric Horn (para 2-53, 2-54).
u. Cab Heating and Ventilating Systems (para 2-55 thru 2-58).
v. Compressed Air System (para 2-59, 2-60).
w. Brake System (para 2-61 thru 2-70).
x. Auxiliary Air-Powered Systems (para 2-71 thru 2-74).
y. Steering System (para 2-75, 2-76).
z. Power Takeoff (para 2-77, 2-78).
aa. Winch (para 2-79, 2-80).
bb. Winterization Kit (para 2-81, 2-82).

2-1. OVERVIEW (Continued).

You can find other basic information about the M915, M916, and M920 Truck Tractors and Chassis for the M917, M918, and M919 in:

a. Chapter 5, section II (Circuit Descriptions).

b. Appendix D (Schematic Diagrams).

c. TM 9-2320-273-10 (Operating Instructions for the M915, M916, and M920 Truck Tractors and Chassis for the M917, M918, and M919).

Section I TRUCK/TRACTOR CHASSIS

2-2. INTRODUCTION.

Following is a description of the basic chassis and cab and illustrations of the power train. You will find detailed descriptions of the major components shown in subsequent sections in this chapter.

2-3. BASIC CHASSIS AND CAB.

The basic chassis and cab for all M915 thru M920 vehicles is the Crane Carrier Corporation Centaur Model T3824. Three frame types are used, each designated by its corresponding chassis.

a. Type I for Model M915 (6 x 4 tractor).

b. Type II for Model M916 (6 x 6 tractor).

c. Type II for Model M918 (6 x 6 bituminous distributor).

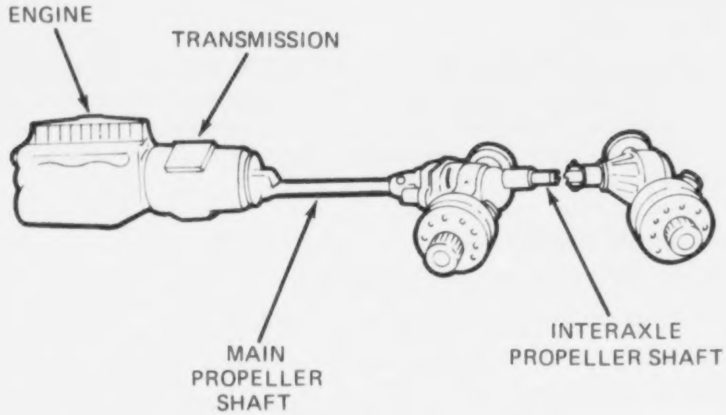
d. Type III for Model M917 (8 x 6 dump truck).

e. Type III for Model M919 (8 x 6 Concrete-Mobile® mixer).

f. Type III for Model M920 (8 x 6 tractor).

The same basic frame is used for each type design. Type II and Type III frames differ from Type I frame by the addition of a 3/8-inch outer channel. The designations given above (6 x 4, 6 x 6 and 8 x 6) refer to the number of wheel positions on the vehicle (first digit) and number of drive wheel positions (second digit). For example: 6 x 4 indicates six wheel positions (inside wheels on rear axles are not counted), and four driving wheel positions.

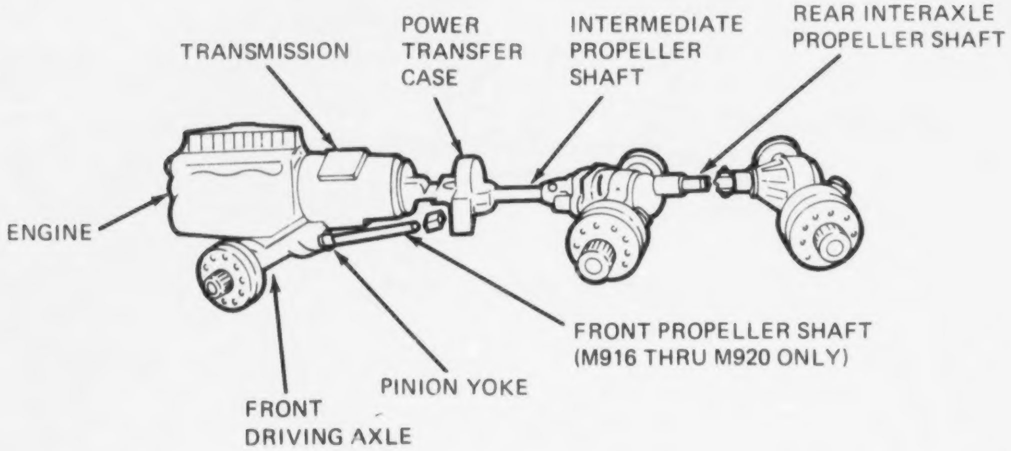
2-4. POWER TRAIN M915.


ENGINE
TRANSMISSION
MAIN PROPELLER SHAFT
INTERAXLE PROPELLER SHAFT

2-5. POWER TRAIN – M916 thru M920.

NOTE

Pusher Axle (not shown) on Models M917, M919, and M920 is non-driving unit.


TRANSMISSION
POWER TRANSFER CASE
INTERMEDIATE PROPELLER SHAFT
REAR INTERAXLE PROPELLER SHAFT
ENGINE
FRONT PROPELLER SHAFT (M916 THRU M920 ONLY)
PINION YOKE
FRONT DRIVING AXLE

TA 074556

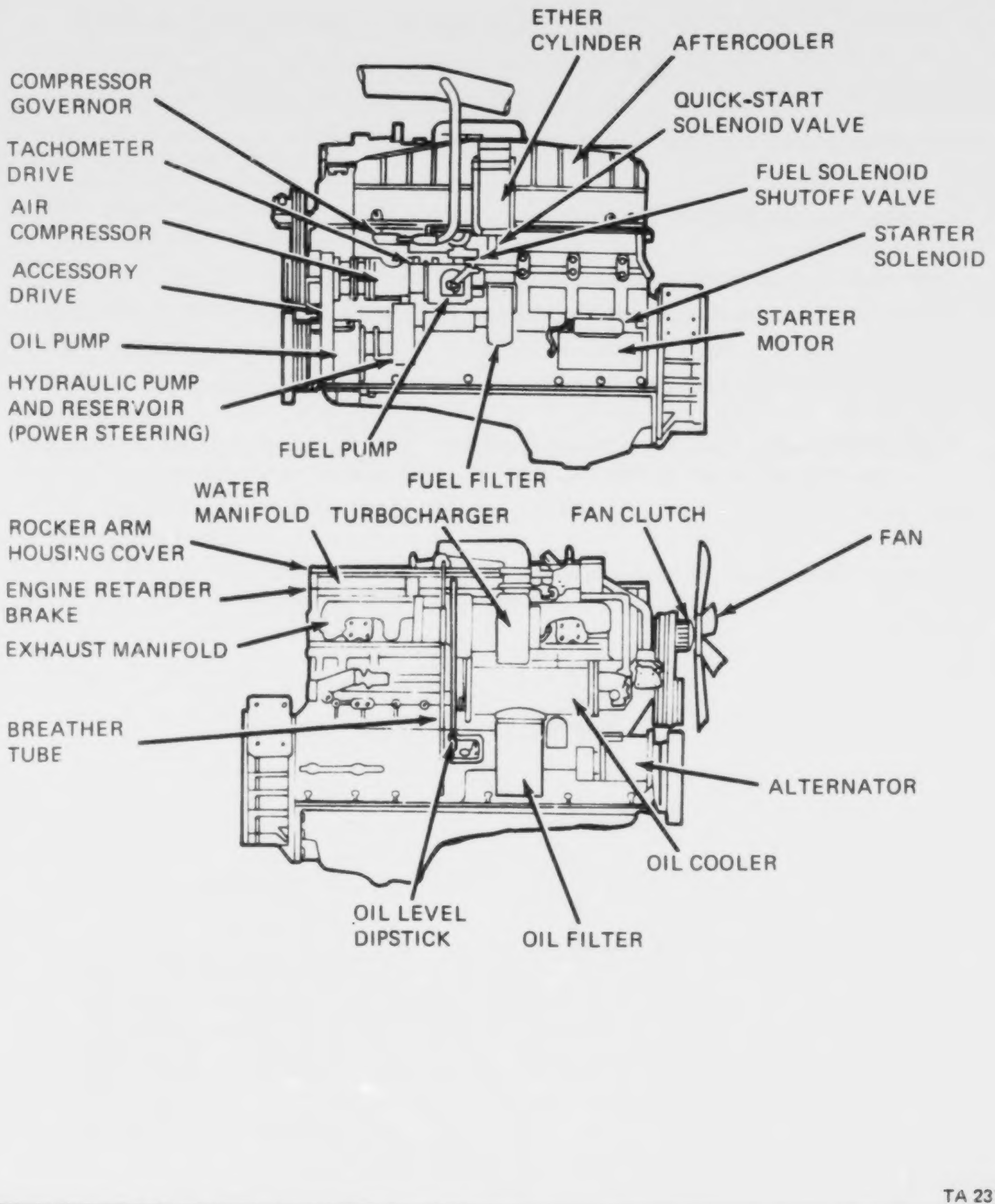
Section II ENGINE

2-6. INTRODUCTION.

The Cummins NTC-400 Engine is used on all M915 thru M920 vehicles. It is an inline, six-cylinder, four-stroke, four-cycle, turbocharged diesel engine. The engine is common to other production truck diesel engines, without special operating or maintenance requirements. This section provides you with illustrations that identify major exterior components. See one of the following associated engine systems in this chapter for details:

a. Engine Controls (section III).
b. Fuel and Air Intake System (section IX).
c. Engine Oil System (section X).
d. Exhaust System (section XI).
e. Cooling System (section XII).
f. Starting and Starting Control System (section XIV).
g. Ether Quick-Start System (section XV).
h. Batteries and Power Generating System (section XVI).

2-7. ENGINE EXTERIOR COMPONENTS.


ETHER CYLINDER
AFTERCOOLER
COMPRESSOR GOVERNOR
QUICK-START SOLENOID VALVE
TACHOMETER DRIVE
FUEL SOLENOID SHUTOFF VALVE
AIR COMPRESSOR
STARTER SOLENOID
ACCESSORY DRIVE
STARTER MOTOR
OIL PUMP
HYDRAULIC PUMP AND RESERVOIR (POWER STEERING)
FUEL PUMP
FUEL FILTER
WATER MANIFOLD
TURBOCHARGER
FAN CLUTCH
FAN
ROCKER ARM HOUSING COVER
ENGINE RETARDER BRAKE
EXHAUST MANIFOLD
BREATHER TUBE
ALTERNATOR
OIL COOLER
OIL LEVEL DIPSTICK
OIL FILTER

TA 237210

Section III ENGINE CONTROLS

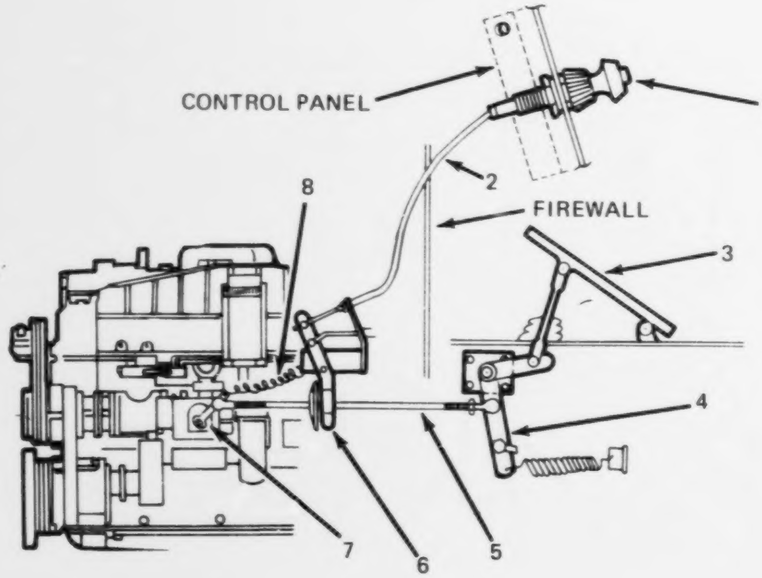
2-8. INTRODUCTION.

Cab engine controls for all M915 thru M920 vehicles are identical. Special body engine speed controls for models M917, M918, and M919 are described in the following manuals:

- *a.* M917 Dump Truck – TM 5-3805-274-24 & P.
- *b.* M918 Bituminous Distributor – TM 5-3895-371-24 & P.
- *c.* M919 Concrete-Mobile® Mixer – TM 5-3895-372-20.

2-9. ENGINE SPEED CONTROLS.

1. HAND THROTTLE. Allows manual control of engine rpm. Throttle motion is transferred by cable to engine mounted pivot lever (6).
2. THROTTLE CABLE. Flex cable from hand throttle to engine mounted pivot lever (6).
3. ACCELERATOR PEDAL. Connected by mechanical linkage to under cab pivot lever (4).
4. PIVOT LEVER. Mechanical linkage that connects accelerator pedal to accelerator rod.
5. ACCELERATOR ROD. Connects accelerator pedal and throttle linkage to accelerator lever on fuel pump.
6. ENGINE MOUNTED PIVOT LEVER. This lever connects the under dash hand throttle cable (ALL) and the winch throttle cable (M916 and M920) to the accelerator rod.
7. ACCELERATOR LEVER. This lever *controls the flow of fuel* through the *fuel pump* thus setting *engine speed.*
8. FUEL CONTROL RETURN SPRING. Return accelerator lever to normal position when hand throttle and accelerator pedal are not engaged.



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2-10. ENGINE RETARDER BRAKE CONTROLS.

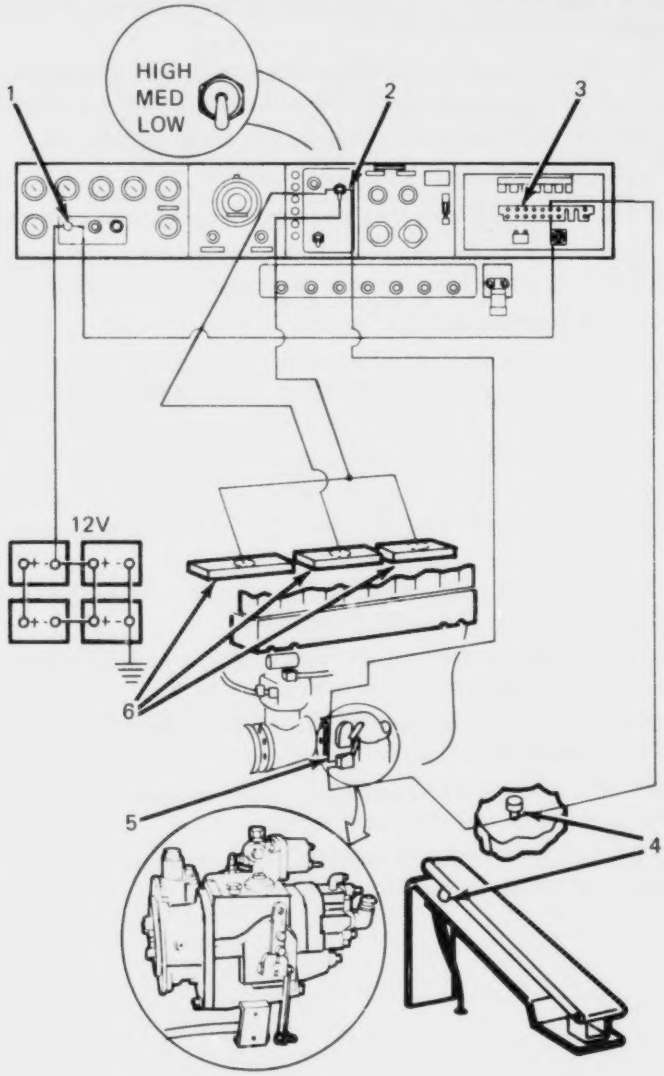
NOTE

In reading the following descriptions make sure that the throttle switch is in its normally-closed position.

1. ENGINE RUN SWITCH. Energizes the 12-volt electrical system, including engine retarder brake circuit.
2. ENGINE RETARDER SWITCH. Three-position switch allows driver to select engine braking for two cylinders (LOW), four cylinders (MED), or six cylinders (HIGH). Depressing foot pedal actuated switch completes 12-volt power circuit to energize one, two, or three solenoids.

2-10. ENGINE RETARDER BRAKE CONTROLS (Continued).

3. CIRCUIT BREAKER (CB-6). Protects electrical components of engine retarder brake circuit by opening when load exceeds 20 amps. Automatically recycles until the overload is removed.
4. FLOOR PEDAL SWITCH. Allows driver to activate engine brake circuit with his left foot. When depressed, switch supplies 12-volt power through CB-6, throttle switch, engine retarder switch, to energize the selected solenoid valve.
5. THROTTLE SWITCH. Open switch prevents activation of engine retarder brake if hand throttle is pulled out or accelerator pedal is pressed down. Activating arm on fuel pump lever closes switch when hand throttle and accelerator are both disengaged.
6. SOLENOID VALVES. When valves are activated, they operate engine braking mechanism.



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Section IV TRANSMISSION AND CONTROLS

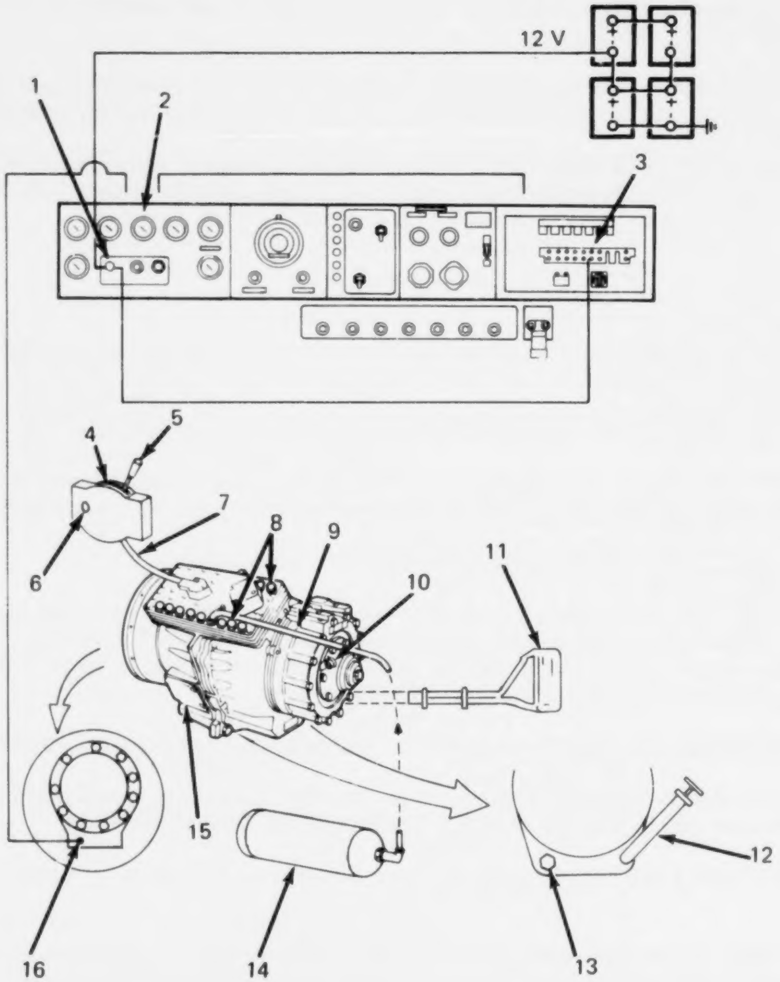
2-11. INTRODUCTION.

The Caterpillar D7155 transmission is used on all M915 thru M920 trucks. It is a mechanical drive unit with 16 forward speeds and 2 reverse speeds. The transmission is bolted directly to engine flywheel housing.

2-12. TRANSMISSION AND CONTROLS.

1. ENGINE RUN SWITCH. Energizes the 12-volt electrical system, including the transmission oil temperature gage circuit.
2. TRANSMISSION OIL TEMPERATURE GAGE. Signal from sending unit actuates pointer gage showing transmission oil temperature.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of transmission oil temperature circuit when load exceeds 20 amps. Automatically recycles until the overload is removed.
4. RATIO SELECTOR UNIT. Floor-mounted, houses transmission controls.
5. GEAR SELECTOR. Allows operator to select desired gear.
6. TRANSMISSION AIR CHARGING VALVE. Used to charge control line when starting up.
7. CONTROL LINE. Carries pneumatic pressure which controls pressure from supply line. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
8. BREATHERS. Prevent air pressure buildup in case.
9. SUPPLY LINE. Pneumatic pressure, controlled by line from ratio selector and sets transmission to selected gear. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
10. SPEEDOMETER CABLE. Provides engine speed input to tachograph.
11. TRANSMISSION OIL COOLER. Two hydraulic lines carry warm oil from the transmission to an oil cooler mounted in front of radiator. Once cooled, the oil is returned to the transmission.
12. DIPSTICK AND OIL FILL PORT. Used to inspect and replenish oil supply. Normal capacity: at oil change 5.5 gallons (21 liters) of engine oil.
13. DRAIN PLUG. Provides access for draining oil. Has magnetic base to attract foreign particles in the oil and warn of unusual wear of the internal parts.
14. SUPPLY RESERVOIR. Provides air supply line. Normal air pressure is 90-120 psi (transmission is disengaged if air pressure drops below 60 psi).
15. ACCESS PLATE. Provides opening for access to oil pump suction line screen. There is an identical plate on the opposite side of the transmission.
16. TRANSMISSION OIL TEMPERATURE SENDING UNIT. Provides electrical signal to temperature gage for indicating transmission oil temperature.

2-12. TRANSMISSION AND CONTROLS (Continued).


12 V
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Section V POWER TRANSFER CASE AND REAR AXLE DIFFERENTIAL LOCKUP

2-13. INTRODUCTION.

The power transfer cases on M916 thru M920 trucks provide a means of engaging or disengaging front wheel drive. The instrument panel control for this feature also allows the driver to lock up the rear inter-axle differential so that all differentials on rear axle tandem turn the same speed. (The instrument panel control engages or disengages the front propeller shaft to the front driving axle (M916 thru M920) and the inter-axle differential located in all the forward rear tandem axles.) On M916 and M920 models only, an oil cooler is used to keep the transfer case lubricant within the proper temperature range during warm weather operation. It is disconnected in cold weather to prevent cooler damage (see para 7-9).

The M915 is a 6 x 4, activating the differential lockout control locks the inter-axle differential thereby connecting the transmission to front tandem and rear tandem axles solidly together.

The forward rear tandem axle is equipped with a no-spin differential which automatically locks, eliminating differential action independent of the manual control, at least three wheels on the rear tandem must turn when the inter-axle differential lock is engaged.

2-14. POWER TRANSFER CASE.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including differential lockup indicator circuit.
2. LOCKUP INDICATOR. Illuminates when lockup switch is closed.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of differential lockup circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. AIR MANIFOLD. Routes air from reservoir to control valve.
5. CONTROL VALVE. Provides control to engage or disengage front wheel drive on M916 thru M920. When front wheel drive is engaged, air pressure is applied to lockup rear axle differential. When front wheel drive is disengaged, air pressure is vented through lockup valve. On M915, this control locks up the rear differential only.
6. OIL COOLER LINE. Carries cooled oil to top of power transfer case. (M916 and M920 only).
7. OIL COOLER. By means of fresh air flow thru fins and tubing, cools warm oil from power transfer case (M916 and M920 only); suspended under winch platform.
8. OIL COOLER LINE. Brings warm oil from power transfer case to oil cooler (M916 and M920 only).
9. OIL PUMP. Driven from upper shaft of power transfer case, draws warm oil from bottom of case, pumps thru cooler, and returns to top of case (M916 and M920 only).
10. OIL PUMP LINE. Carries warm oil from bottom of case to pump (M916 and M920 only).
11. TEE. Replaces drain plug (plug is reinserted in end of tee; provides connection for line (10). (M916 and M920 only).

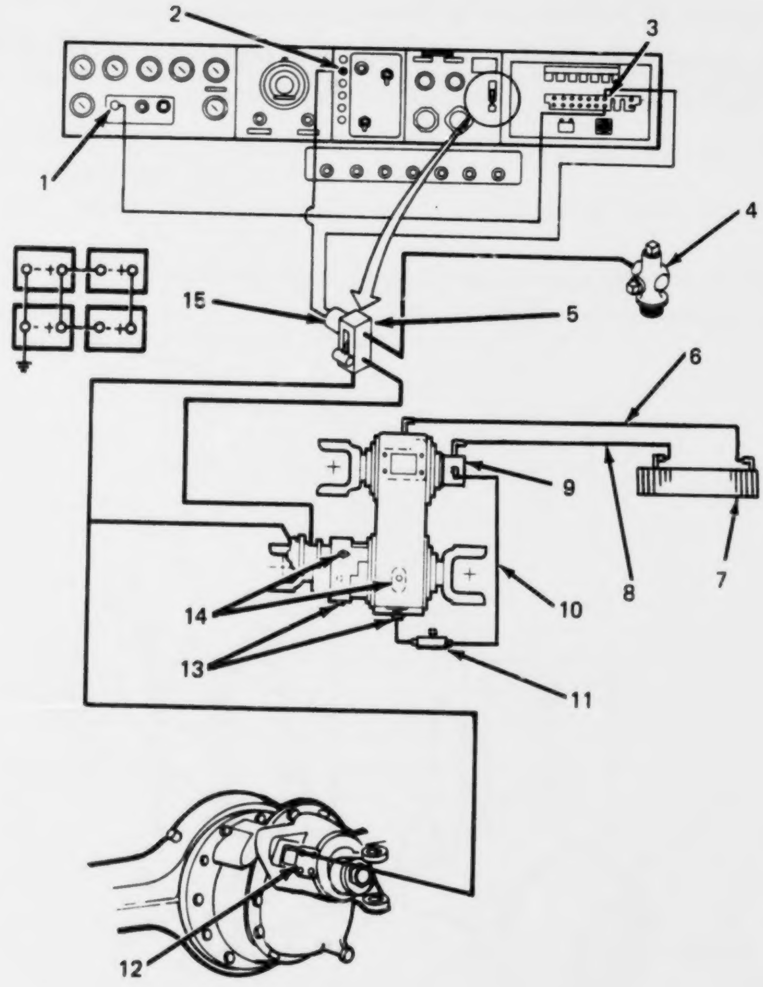
2-14. POWER TRANSFER CASE (Continued).

12. LOCKUP CHAMBER. When air pressure is applied to the chamber, it mechanically locks the rear axle differential in place so that drive is applied to both rear axles. Without air pressure, the differential applies drive to the axle that offers the least resistance.

13. DRAIN PLUGS. Allow draining oil during service intervals. Has magnetic base to attract foreign particles and warn of unusual wear of internal parts.

14. FILLER PLUGS. Provide means of checking and replenishing oil supply.

15. LOCKUP SWITCH. Normally open; closed by 60 psi air pressure to activate lockup indicator circuit.



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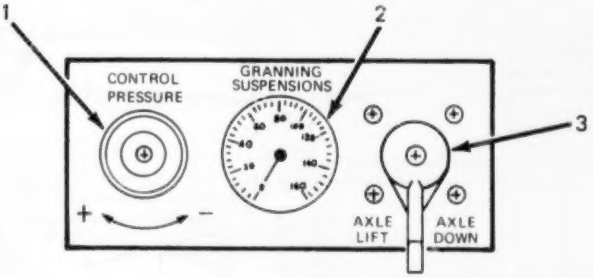
Section VI PUSHER AXLE AND CONTROLS

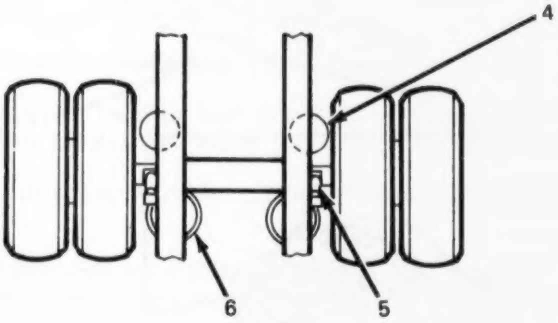
2-15. INTRODUCTION.

A pusher axle is provided on M917, M919, and M920 vehicles.

2-16. PUSHER AXLE.

1. PRESSURE REGULATOR VALVE. Allows operators to regulate air pressure to air bags.
2. PRESSURE GAGE. Air-actuated gage indicates pressure in lines to air bags.
3. UP-DOWN SELECTOR VALVE. In DOWN position, directs air pressure to air bags which lower axle. In UP position, directs pressure to air cylinders which raise axle.
4. AIR CYLINDERS. Provide force to raise axle to stowed position.
5. SHOCK ABSORBERS. Stabilize fluctuations in air bags caused by road surface variations.
6. AIR BAGS. Provide force to lower axle to road position.





TA 074562

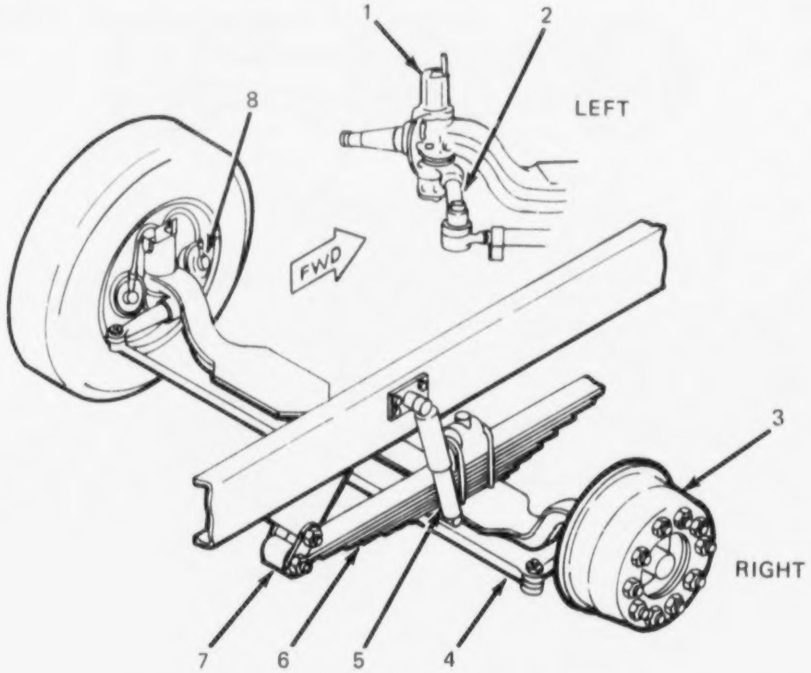
Section VII FRONT AXLE AND SUSPENSION

2-17. INTRODUCTION.

The Model M915 is equipped with a non-driving front axle; the Models M916 thru M920 have a driving front axle. (See power train illustrations in paragraphs 2-4 and 2-5.) Shock absorbers are used only on the Model M915.

2-18. NON-DRIVING FRONT AXLE (M915).

1. KNUCKLE AND KINGPIN ASSEMBLY (Shown with drum removed). Movable joint between the wheel and axle I-beam.
2. STEERING ARM. Connects to power steering drag link (see para 2-76).
3. DRUM. Houses the wheel brakes. Serves as mount for front wheels.
4. TIE ROD ASSEMBLY. Connects left and right knuckles for synchronized movement of both wheels.
5. SHOCK ABSORBERS (M915). Supplement spring and stabilize spring fluctuations caused by road surface variations.
6. LEAF SPRINGS. Absorb and minimize the amount of road shock transmitted to the vehicle frame.
7. SHACKLE. Swinging support that permits the leaf spring to vary in length as it is deflected.
8. BRAKE AIR CHAMBER. When pressure is supplied to the chambers from the air system, they mechanically activate the brake mechanism.



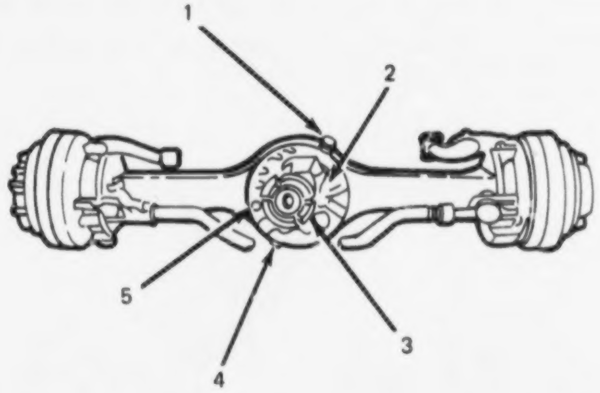
TA 074563

2-19. DRIVING FRONT AXLE (M916 THRU M920).

NOTE

See illustration in para 2-18 for identification and description of common components.

1. BREATHER. Allows fumes from hot oil to escape.
2. CARRIER. Houses differential drive and driven gears.
3. PINION YOKE. Attaches to transfer case propeller shaft universal. (See illustration in para 2-5.)
4. DRAIN PLUG. Allows draining oil at service intervals.
5. FILLER PLUG. Provides access for checking oil level and replenishing oil supply.



TA 074564

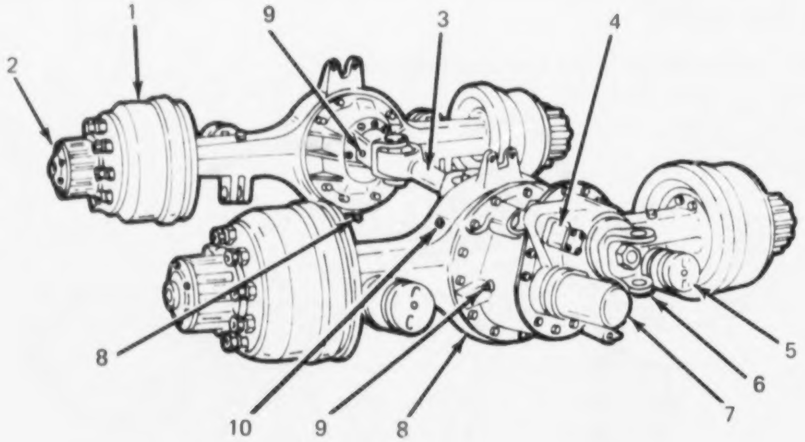
Section VIII REAR AXLE

2-20. INTRODUCTION.

Two similar rear axle assemblies are used in the M915 thru M920 vehicles. The Model M915 uses one type: the Models M916 thru M920 use a different assembly. (Specifications for both axles are given in para 1-11.)

2-21. REAR AXLE (M915).

1. HUB AND DRUM ASSEMBLY. Serves as mount for rear wheels. Houses the brake shoe assemblies which can be mechanically forced against it to slow or stop the vehicle.
2. AXLE SHAFT. Transmits power from the differential gear assembly to the hub assembly inside of axle housing.
3. INTER-AXLE PROPELLER SHAFT. Transmits power to rear axle.
4. DIFFERENTIAL LOCKUP CHAMBER. Air actuated by lockup switch located in cab interior. (Refer to para 2-14 for description.)
5. BRAKE AIR CHAMBER. (Refer to para 2-64 for description.)
6. PINION YOKE. Connects to propeller shaft from transmission.
7. OIL FILTER. Oil filter (under cover) removes impurities from oil in forward rear axle. Filter is replaceable, automobile-type unit (Refer to LO 9-2320-273-12.)
8. DRAIN PLUG. Allows draining oil at service intervals.
9. FILLER PLUG. Used to inspect oil level and replenish oil supply.
10. BREATHER. Allows fumes from hot oil to escape.



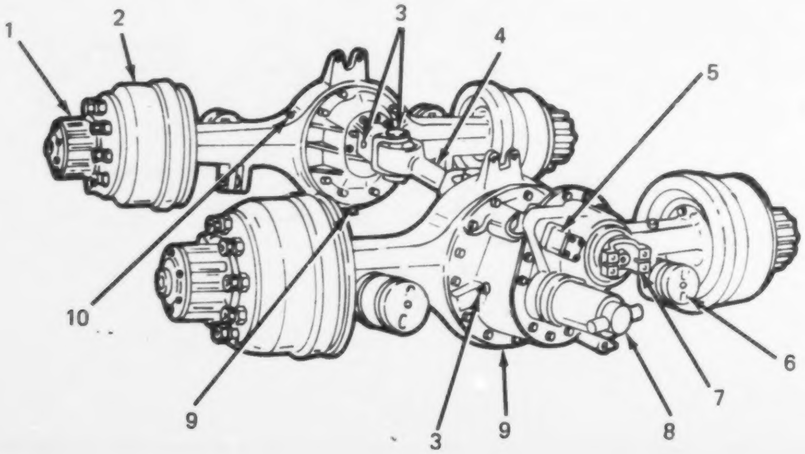
TA 074565

2-22. REAR AXLE (M916 THRU M920).

NOTE

See illustraton in paragraph 2-21 for identification and description of common components. For organizational maintenance purposes, the basic difference between the axles shown in paragraphs 2-21 and 2-22 is that the axle shown below does not have an oil filter. Quantity and placement of fill and drain plugs also differ from one configuration to the other.

1. AXLE SHAFT. Transmits power from the differential gear assembly to the hub assembly inside of axle housing.
2. HUB AND DRUM ASSEMBLY. Serves as mount for rear wheels. Houses the brake shoe assemblies which can be mechanically forced against it to slow or stop the vehicle.
3. FILLER PLUG. A plug used to gain access for inspecting oil level and replenishing oil supply.
4. INTER-AXLE PROPELLER SHAFT. Transmits power for forward-rear to rear-rear axle.
5. DIFFERENTIAL LOCKUP CHAMBER. Air actuated by lockup switch located in cab interior. (Refer to para 2-14 for description.)
6. BRAKE AIR CHAMBER. (Refer to para 2-64 for description.)
7. PINION YOKE. Connects to propeller shaft from power transfer case.
8. DIFFERENTIAL INTERNAL LUBRICATION PUMP. Circulates gear lubricant under pressure thru differential gears.
9. DRAIN PLUG. A magnetic plug which allows draining oil at service intervals. Also, draws metallic particles from the oil.
10. BREATHER. Allows fumes from hot oil to escape.



TA 074566

Section IX FUEL AND AIR INTAKE SYSTEM

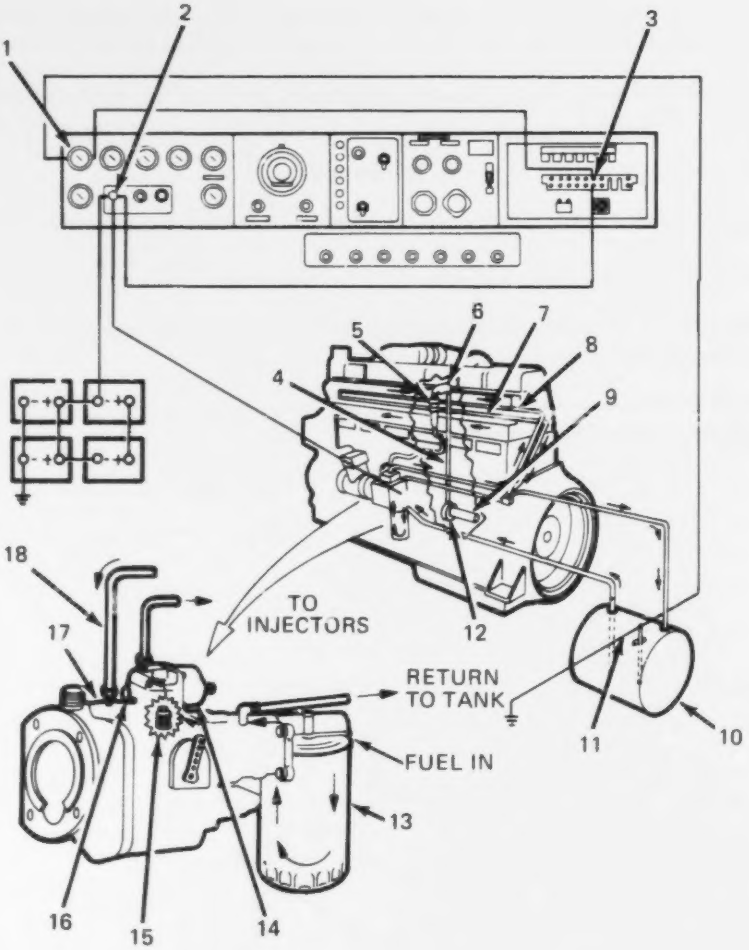
2-23. INTRODUCTION.

This system is comprised of two basic subsystems: fuel delivery and air intake. The systems are identical in all M915 thru M920 vehicles.

2-24. FUEL DELIVERY.

1. FUEL GAGE. Needle actuated by electrical signal from sending unit which shows level of fuel in tank.
2. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including circuits to solenoid shutoff valve and fuel level sending unit.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of fuel system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
4. PUSH TUBE. Transmits motion from cam follower to rocker arm assembly.
5. INJECTOR. Cam timed to meter and inject fuel into each cylinder.
6. ROCKER ARM. Transmits directional movement from push tube to injector.
7. FUEL DELIVERY LINE. Carries fuel under pressure from fuel pump to fuel manifold.
8. BYPASS LINE. Carries excess fuel from manifold back to tank.
9. CAMSHAFT. Determines valve and injector timing.
10. TANK. 118-gallon (446.63 liters) capacity (110-gallon (416.35 liters) draw).
11. FUEL LEVEL SENDING UNIT. Provides electrical signal to fuel gage for indicating fuel quantity in tank.
12. CAM FOLLOWER. Mechanical lever transmits cam lobe movement from cam shaft to push tube.
13. FILTER. Throwaway filter removes impurities from fuel. Petcock in bottom allows operator to drain off water filtered from fuel.
14. SOLENOID SHUTOFF VALVE. Normally closed, shutting off fuel supply to engine. Open when engine run switch is ON.
15. SCREEN FILTER. Located in fuel pump. Provides additional filtration for fuel prior to entering engine.
16. MANUAL OVERRIDE FOR FUEL SHUTOFF SOLENOID. Normally closed, can be screwed open to allow operation of engine when solenoid is not working.
17. FUEL PUMP. Gear driven from compressor drive. Built-in governor meters fuel through screen filter, solenoid shutoff valve, and into injectors. Excess fuel from pump is returned to the tank. The tachometer drive is located on the pump housing.
18. AIR ACTUATING LINE. Carries pressurized air from intake manifold to fuel pump. Pressure from line opens valve in pump and allows full fuel flow.

2-24. FUEL DELIVERY (Continued).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12
TO INJECTORS
RETURN TO TANK
FUEL IN
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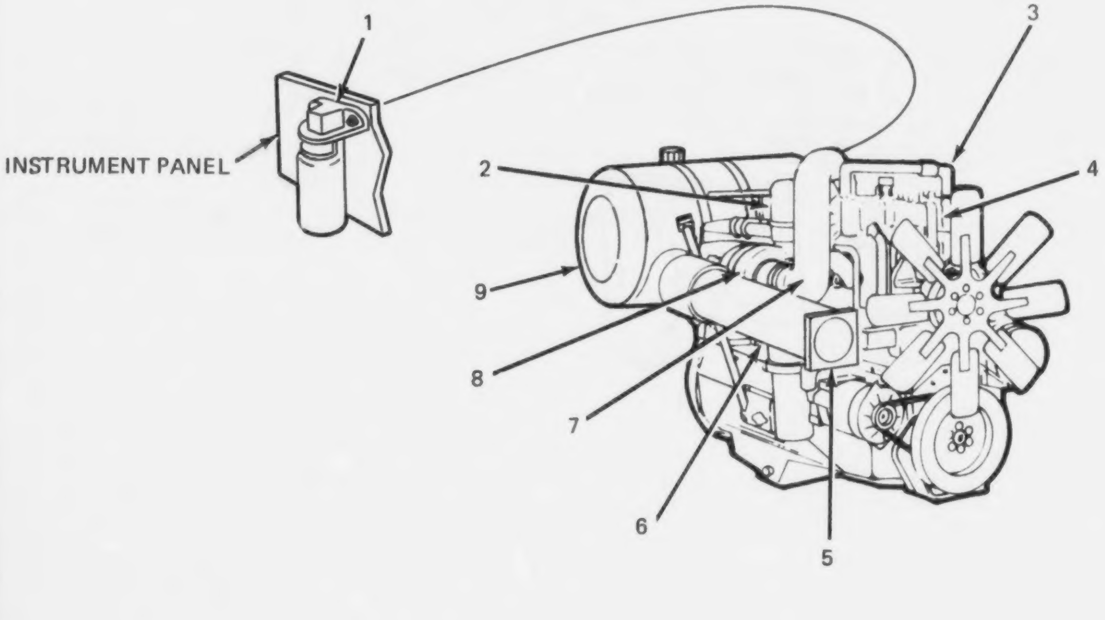
TA 074567

2-25. AIR INTAKE.

1. AIR RESTRICTION INDICATOR. Mounted on instrument panel. A red signal shows on indicator housing when air cleaner needs servicing. A tube connects the indicator to the air cleaner outlet. When air flow through the cleaner is restricted, the red signal becomes visible. The unit is factory set to signal at a specific filter restriction. Resetting is accomplished by pushing a button which is recessed in the bottom.
2. CROSSOVER TUBE. Directs compressed air from turbocharger, through aftercooler, to intake manifold.
3. AFTERCOOLER. Cools air entering intake manifold from turbocharger. Water flow from engine cooling system absorbs heat. (See illustration of cooling system in paragraph 2-32.)
4. ENGINE INTAKE MANIFOLD. Directs compressed air charge to each cylinder after it has been cooled by aftercooler.
5. PLENUM. Directs outside air to the air intake tube.
6. AIR INTAKE TUBE. Draws outside air through grille mounted plenum and into air cleaner.
7. INLET TUBE. Directs air from air cleaner to turbocharger.
8. TURBOCHARGER. Driven by exhaust gases (para 2-30). Compresses air in the intake manifold to increase engine power.
9. AIR CLEANER. Mounted on fire wall. Removes impurities from air entering turbocharger. Has replaceable dry, two-stage element.



TA 074568

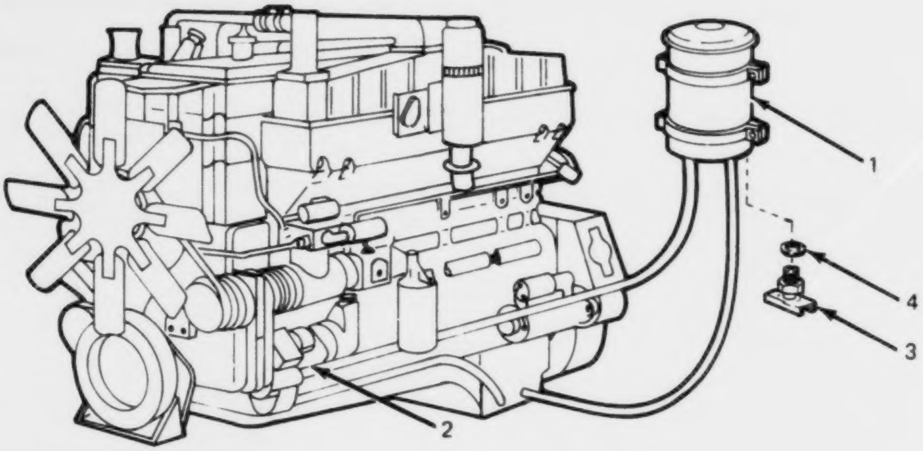
Section X ENGINE OIL SYSTEM

2-26. INTRODUCTION.

The engine oil system is identical on all M915 thru M920 vehicles. The system provides lubricating oil for moving internal engine parts and the turbocharger. In addition, engine oil is used by the Jacobs® brake (engine retarder).

2-27. COMPONENTS AND PIPING ARRANGEMENT.

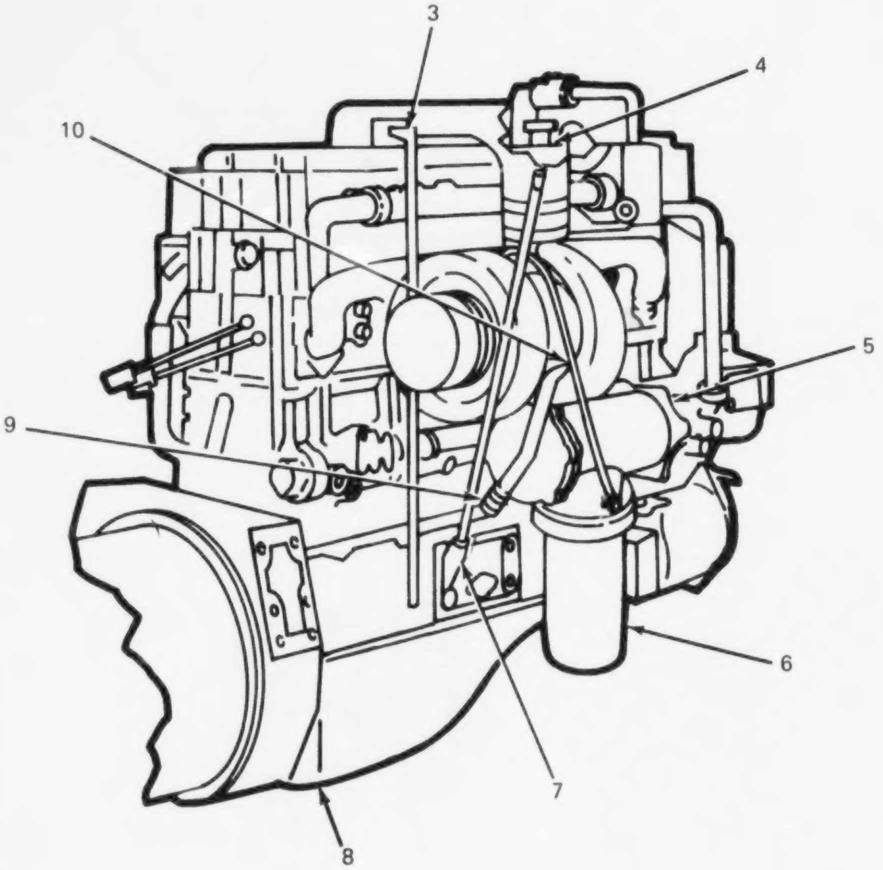
1. OIL BYPASS FILTER. Provides additional filtration, allowing a longer period between oil changes. Oil from pump circulates through the filter, then to the sump.
2. OIL PUMP. Circulates oil through engine to provide cooling and lubrication.
3. DRAINCOCK. Provide passage for draining oil.
4. FLATWASHER. Provides seal between draincock and oil bypass filter.



TA 237211

2-27. COMPONENTS AND PIPING ARRANGEMENT (Continued).

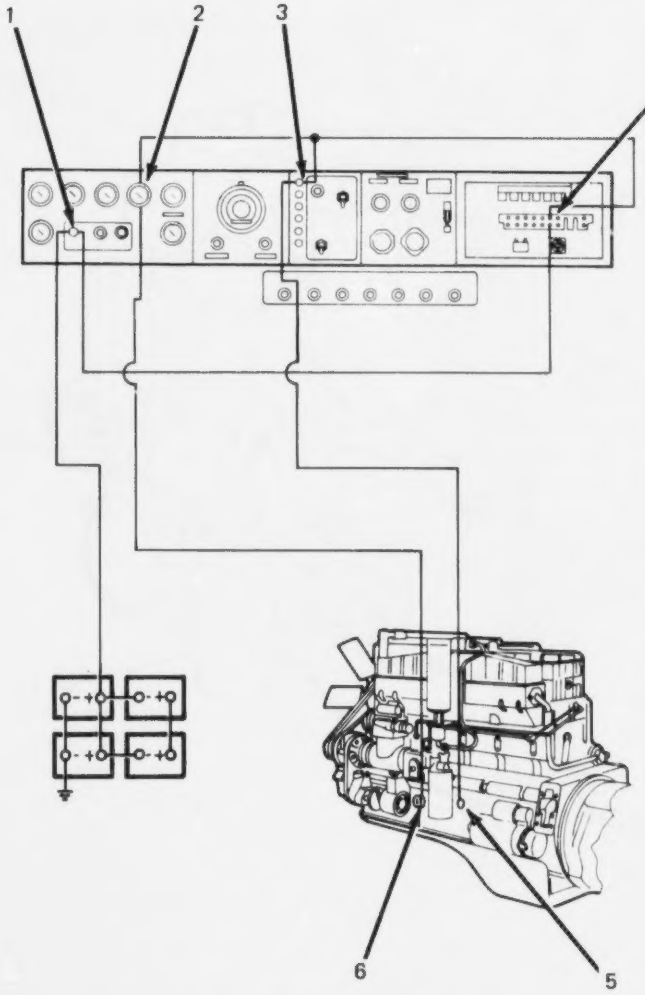
3. BREATHER TUBE. Allow fumes from hot oil to escape.
4. OIL FILLER. Located in engine cover. Used for replenishing engine oil supply.
5. OIL COOLER. Coolant circulates through internal tubes of oil cooler and carries away heat from engine oil.
6. PRIMARY OIL FILTER. Throwaway filter removes dirt and foreign particles from oil.
7. DIPSTICK. Engine oil level indicator.
8. DRAIN PLUG. Located in bottom of engine oil pan. Used to drain oil from engine.
9. OIL RETURN LINE. Carries return oil from turbocharger to engine block.
10. OIL SUPPLY LINE. Carries oil under pressure to cool and lubricate turbocharger.



TA 074570

2-28. OIL MONITORING SYSTEM.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including oil pressure gage and warning light circuits.
2. OIL PRESSURE GAGE. Needle activated by electrical signal from oil pressure sending unit indicates engine oil pressure.
3. OIL WARNING LIGHT. Indicator light is activated by 12-volt power from pressure switch when engine oil pressure drops below 5 psi (34 kPa).
4. CIRCUIT BREAKER (CB-6). Protects electrical components of oil system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
5. PRESSURE SWITCH. Closes when oil pressure drops below 5 psi (34 kPa) and supplies 12-volt power to oil warning indicator.
6. OIL PRESSURE SENDING UNIT. Provides electrical signal to oil pressure gage to indicate oil pressure.



TA 074571

Section XI EXHAUST SYSTEM

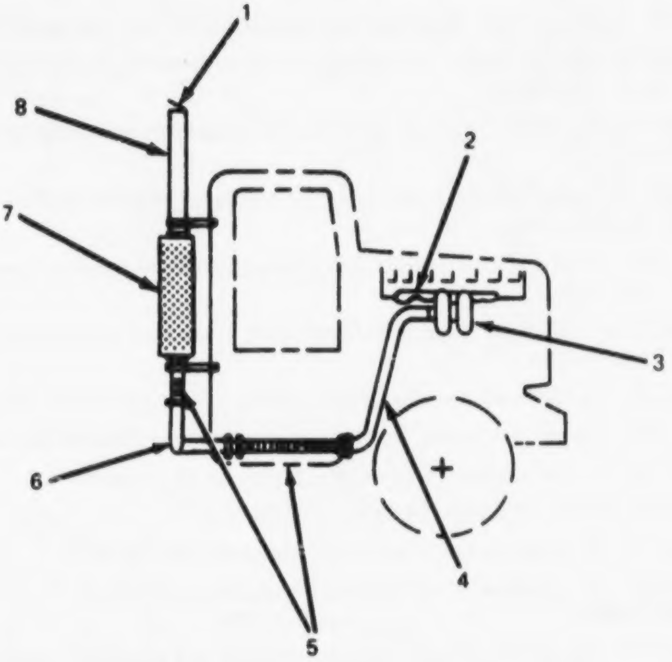
2-29. INTRODUCTION.

The exhaust system is identical in all M915 thru M920 vehicles, except for minor variations in arrangement.

2-30. EXHAUST SYSTEM.

1. RAIN CAP. Prevents entry of rain and dirt into exhaust pipes when engine is not in use.
2. EXHAUST MANIFOLD. Bolted to exhaust ports on cylinder heads. Collects exhaust from ports and directs it to turbocharger.
3. TURBOCHARGER. See illustration and description in paragraph 2-25.
4. TURBO OUTLET PIPE. Carries hot exhaust away from turbocharger.
5. FLEX PIPE(S). Connect turbo outlet pipe, muffler inlet pipe, and muffler. Pipes are flexible to allow for vibrations and expansion in system.
6. MUFFLER INLET PIPE. Connects flex pipes.
7. MUFFLER. Directs exhaust through baffles to deaden noise.
8. EXHAUST STACK. Directs exhaust from muffler.

2-30. EXHAUST SYSTEM (Continued).



TA 074572

Section XII COOLING SYSTEM

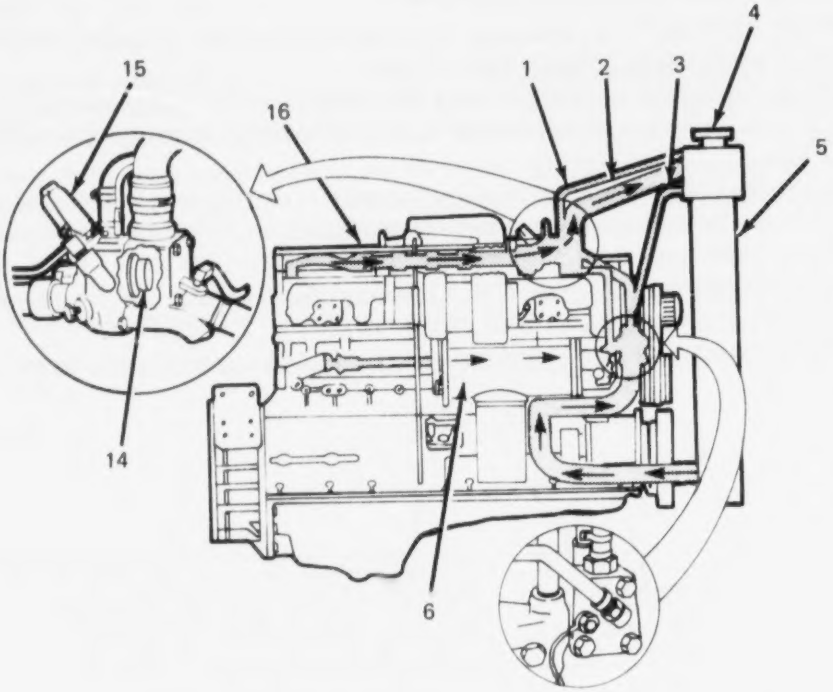
2-31. INTRODUCTION.

The cooling system is identical in all M915 thru M920 vehicles. The system provides coolant for the engine block, oil cooler, aftercooler, fuel injectors, and air compressor.

2-32. COMPONENTS AND PIPING ARRANGEMENT.

1. THERMOSTAT DEAERATION LINE. Escape route for air trapped in radiator top or thermostat housing.
2. RADIATOR INLET HOSE. Channels hot coolant into radiator when thermostat is open.
3. ENGINE SHUNT LINE. Allow air bubbles from coolant in pump to escape into radiator, to prevent pump cavitation.
4. RADIATOR CAP. Closes off filler opening and keeps system under pressure up to a maximum of 10 psi.
5. RADIATOR. Coolant is circulated through a series of fins and baffles so that outside air flow can dissipate heat.
6. OIL COOLER. Engine coolant circulates through internal tubes of cooler and carries away heat from engine.
7. AFTERCOOLER. Coolant flowing through core cools hot air entering intake manifold ports from turbocharger.
8. WATER LINE. Carries water under pressure from block to aftercooler.
9. WATER LINE. Carries hot water from air compressor to thermostat housing.
10. WATER LINE. Carries coolant from water pump to air compressor.
11. ACCESSORY DRIVE. Powers the fan and water pump.
12. FAN. Forces air through radiator to control coolant temperature.
13. FAN CLUTCH. Air pressure from actuator engages fan when coolant temperature rises above 190°F (88°C).
14. THERMOSTAT. Shuts off coolant flow to radiator until temperature reaches 185°F (85°C). Coolant is then directed through radiator inlet hose to the radiator.
15. FAN CLUTCH ACTUATOR. When coolant temperature rises above 190°F (88°C), actuator directs compressed air into fan clutch causing fan to engage.
16. WATER MANIFOLD. Collects coolant from cylinder heads and directs it to thermostat housing.

2-32. COMPONENTS AND PIPING ARRANGEMENT (Continued).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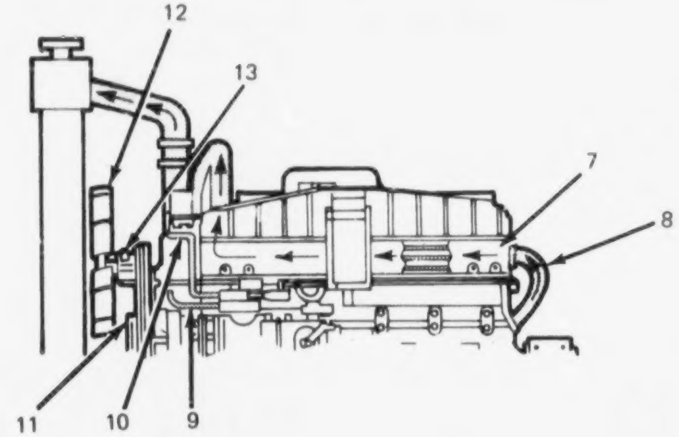
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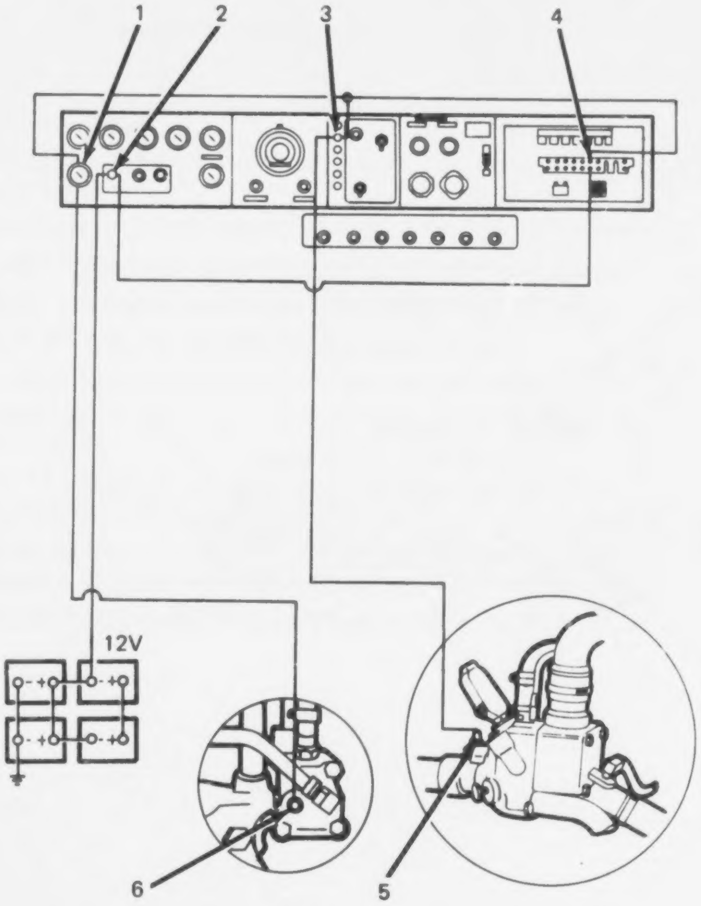
TA 074573

2-33. COOLANT TEMPERATURE MONITORING SYSTEM.

1. WATER TEMPERATURE GAGE. Shows coolant temperature actuated by electrical signal from water temperature sending unit.
2. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including temperature gage and temperature indicator light circuits.
3. ENGINE COOLANT TEMPERATURE WARNING LIGHT. Activated by 12-volt power from water temperature switch when engine temperature exceeds 225°F (107°C).
4. CIRCUIT BREAKER (CB-6). Protects electrical components and wiring of coolant system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
5. WATER TEMPERATURE SWITCH. Normally open, closes to activate indicator light when coolant temperature exceeds 225°F (107°C).
6. WATER TEMPERATURE SENDING UNIT. Provides electrical signal to temperature gage.



TA 073922

Section XIII RELAYS, CIRCUIT BREAKERS, AND WIRE IDENTIFICATION

2-34. INTRODUCTION.

a. The electrical relays are identical in all M915 thru M920 vehicles, except for minor variations in arrangement. The M917, M918, and M919 use two relays, the M915 use seven relays; while the M916 and M920 use eight.

b. The circuit breakers are identical in the M915 thru M920 vehicles, except for minor variations in arrangement. The M917, M918, and M919 use six circuit breakers to protect their electrical systems, the M915 uses eight; while the M916 and M920 use nine. These circuit breakers are rated at 20 amps continuous load. If an overload does occur, the circuit breaker automatically recycles (opens and closes) until the overload is removed.

2-35. RELAYS AND CIRCUIT BREAKERS.

1. RELAY (K1). (M915 thru M920) Normally open contacts: Provides 12-volt power to the electric horn when energized.
2. RELAY (K2). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer left turn signal light when energized.

   RELAY (K2). (M918 and M919) Normally closed contacts: Provides 12-volt power to the backup alarm when energized.

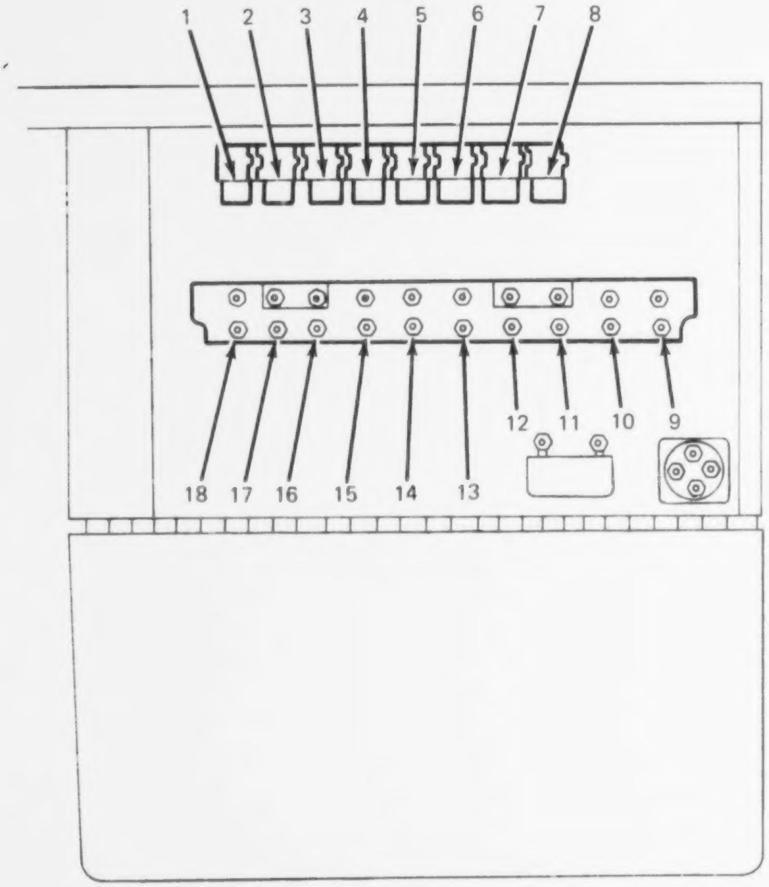
   RELAY (K2). (M917) Normally closed contacts: Disconnects 12-volt power from tractor backup lights when the Operation switch is in BLACKOUT position.
3. RELAY (K3). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer right turn signal light when energized.
4. RELAY (K4). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer blackout stop lights when energized.
5. RELAY (K5). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer blackout tail lights when energized.
6. RELAY (K6). (M915, M916, and M920) Normally open contacts: Provides 24-volt power to trailer marker and tail lights when energized.
7. RELAY (K7). (M915, M916, and M920) Normally closed contacts: Disconnects 12-volt power from tractor backup lights when operation switch is in BLACKOUT position.
8. RELAY (K8). (M916 and M920) Normally closed contacts: Provides 12-volt power to work lamps when WORK LAMPS switch is ON.
9. ENGINE TEMPERATURE DIODE. Provides a circuit to illuminate engine temperature indicator when engine is cranking, and prevents engagement of the starter by feedback voltage in the event the water temperature switch closes.
10. CIRCUIT BREAKER (CB-9). Protects the 12-volt work lamps circuit in the M916 and M920 vehicles.
11. CIRCUIT BREAKER (CB-8). Protects the 24-volt blackout stop, marker, and tail light circuits for trailers used with the M915, M916, and M920 vehicles.
12. CIRCUIT BREAKER (CB-7). Protects the 24-volt left and right turn signals and blackout tail light circuits for trailers used with the M915, M916, and M920 vehicles.
13. CIRCUIT BREAKER (CB-6). Protects the 12-volt engine retarder brake, instrument gages, low air, park brake, and differential lockout circuits in the M915 thru M920 vehicles.
14. CIRCUIT BREAKER (CB-5). Protects the 12-volt backup lights and ether start circuits in the M915 thru M920 vehicles.
15. CIRCUIT BREAKER (CB-4). Protects the 12-volt heater fan motor circuit in the M915 thru M920 vehicles.
16. CIRCUIT BREAKER (CB-3). Protects the 12-volt cigar lighter and dome light circuits in the M915 thru M920 vehicles.

    CIRCUIT BREAKER (CB-3). Protects the 12-volt utility outlets on the M915, M916, and M920 vehicles.

2-35. RELAYS AND CIRCUIT BREAKERS (Continued).

17. CIRCUIT BREAKER (CB-2). Protects the 12-volt electric horn and turn signal flasher circuits in the M915 thru M920 vehicles.

18. CIRCUIT BREAKER (CB-1). Protects the 12-volt stop light, operation switch, turn signal, and instrument lighting circuits in the M915 thru M920 vehicles.



TA 073920

2-36. WIRE IDENTIFICATION.

The electrical wiring on the M915 thru M920 vehicles is contained in braided or loomed harness assemblies. The wires are permanently hot-stamped with individual circuit numbers. The circuit numbers appear two inches from each termination end and every six inches throughout the length. Refer to Appendix D for wiring harness drawings and electrical system diagrams, for circuit numbers and terminations.

Section XIV STARTING AND STARTING CONTROL SYSTEM

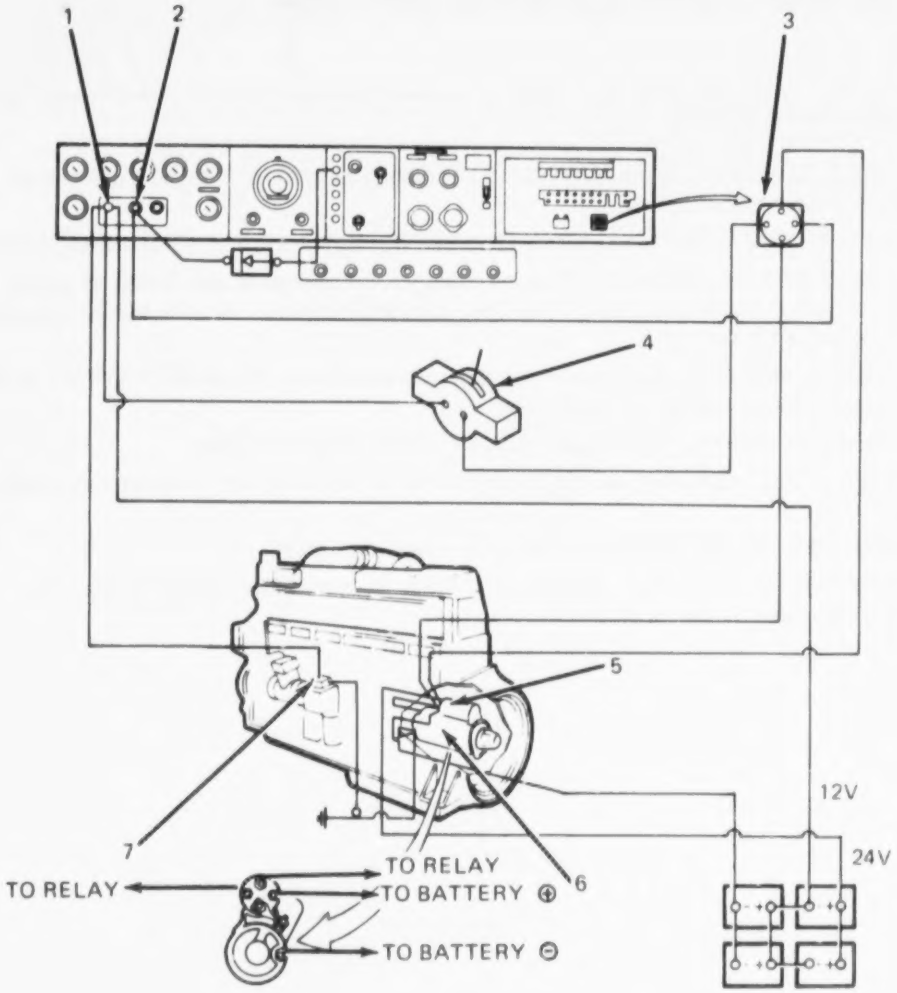
2-37. INTRODUCTION.

The starting and starting control system is identical in all M915 thru M920 vehicles.

2-38. STARTING AND STARTING CONTROL SYSTEM.

1. ENGINE RUN SWITCH. Directly controls fuel solenoid shutoff valve and allows remainder of starting circuit to be placed into operation when the start button is depressed.
2. ENGINE START BUTTON. Activates starting circuit by energizing the starter relay.
3. STARTER RELAY. With ENGINE RUN switch on, transmission ratio selector lever in neutral, and ENGINE START button depressed, the relay energizes and closes the starter solenoid circuit.
4. NEUTRAL SAFETY SWITCH. Switch is normally open. Starting circuit cannot be activated when ratio selector lever is in any position other than neutral.
5. STARTER SOLENOID. 12-volt power is applied to the starter solenoid when starter relay is energized. The solenoid closes and supplies 24-volt power, which energizes the starter motor.
6. STARTER MOTOR. When energized, the motor engages the flywheel to start the engine.
7. FUEL SOLENOID SHUTOFF VALVE. When the ENGINE RUN switch is turned on, valve is energized and opens to allow fuel to pass to the injectors. (See paragraph 2-24 for description of fuel system.)

2-38. STARTING AND STARTING CONTROL SYSTEM (Continued).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12V
24V
TO RELAY
TO RELAY
TO BATTERY ⊕
TO BATTERY ⊖

TA 073921

Section XV ETHER QUICK-START

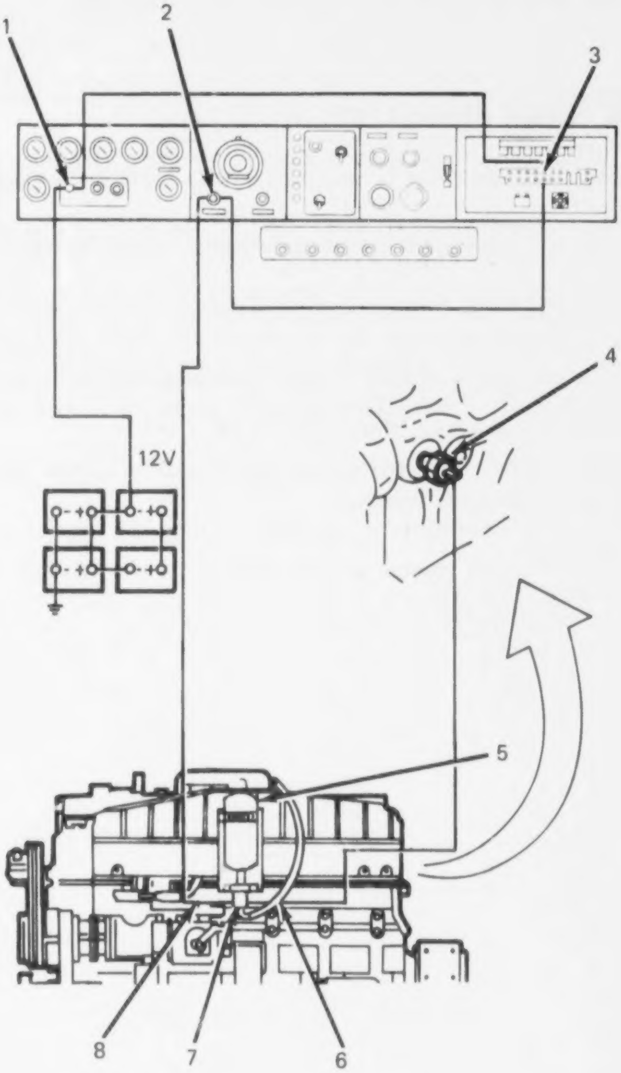
2-39. INTRODUCTION.

The quick-start system is identical in all M915 thru M920 vehicles.

2-40. ETHER QUICK-START.

1. ENGINE RUN SWITCH. Energizes 12-volt electrical system, including quick-start solenoid valve circuit.
2. ETHER BUTTON. Activates solenoid valve. Will not work if thermal switch is open.
3. CIRCUIT BREAKER (CB-5). Protects electrical components and wiring of quick-start system by opening circuit when load exceeds 20 amps. Automatically recycles until overload is removed.
4. THERMAL SWITCH. Opens when coolant temperature is above 50°F (10°C), and prevents solenoid valve from activating.
5. ETHER CYLINDER. Replaceable 18-oz (710 cc) ether container.
6. ETHER TUBE. Carries ether from solenoid valve thru atomizer to engine air intake manifold.
7. ATOMIZER. Sprays fine ether mist into intake manifold.
8. SOLENOID VALVE. Controls release of ether from cylinder. When solenoid is energized, ether flows to atomizer.

2-40. ETHER QUICK-START (Continued).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12V
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TA 074574

Section XVI BATTERIES AND POWER GENERATING SYSTEM

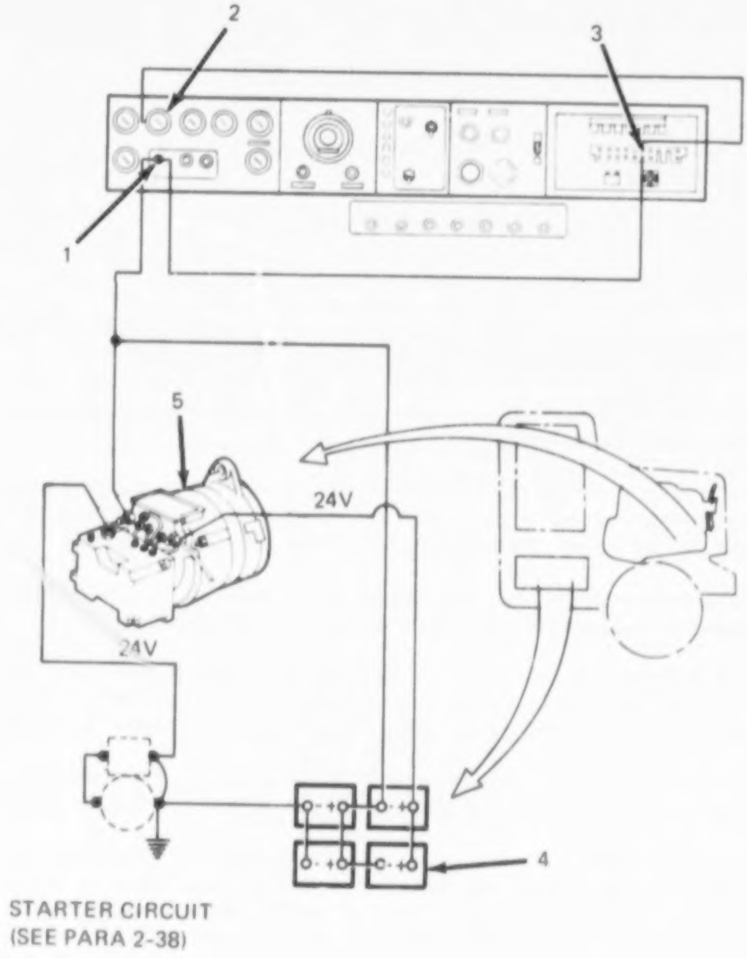
2-41. INTRODUCTION.

The battery and generating system provides 12- and 24-volt power to electrical systems in M915 thru M920 vehicles. The power generating system is identical for all vehicles.

2-42. BATTERIES AND POWER GENERATING SYSTEM.

1. ENGINE RUN SWITCH. Supplies 12-volt power from batteries through switch, circuit breaker, to voltmeter.
2. VOLTMETER. 10- to 16-volt gage indicates voltage provided by battery pack, and alternator.
3. CIRCUIT BREAKER (CB-6). Protects electrical components of volt meter circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. BATTERY PACK. Comprised of four 12-volt, maintenance-free batteries. Two batteries wired in parallel in each set. Each set connected in series for 24-volt output. Battery pack is used for both 12- and 24-volt output.
5. AC GENERATOR (ALTERNATOR). Generates voltage for recharging battery pack. Has external 24-volt transformer rectifier.

2-42. BATTERIES AND POWER GENERATING SYSTEM (Continued).


2
3
1
5
24V
24V
4
STARTER CIRCUIT
(SEE PARA 2-38)

TA 074575

Section XVII SERVICE LIGHTING SYSTEM

2-43. INTRODUCTION.

The service lighting system provides illumination required while operating the vehicles. This system is comprised of the following subsystems:

a. Headlamps and Tail Lamps (para 2-44).

b. Marker and Clearance Lamps (para 2-45).

c. Turn Signals and Hazard Warning Lamps (para 2-46).

d. Backup Lamps (para 2-47).

e. Work Lamps (para 2-48).

f. Instrument and Cab Dome Lamps (para 2-49).

g. Stop Lamps (See brake switches and indicators (para 2-63)).

Individual circuit descriptions, except stop lamps, follow in this section. You can find a complete electrical schematic diagram and wiring harness diagrams in Appendix D.

2-44. HEADLAMPS AND TAIL LAMPS.

When headlamp switch is on, and operation lamp switch is in NORMAL, battery power is supplied to illuminate the headlamps and tail lamps as well as the trailer tail lamps on the M915, M916, M917, and M920. The trailer tail lamps are powered through tractor chassis receptacles.

1. HEADLAMPS. Each assembly has two filaments in a sealed unit, a high beam and a low beam. Selection of high or low beam is controlled by the dimmer switch.

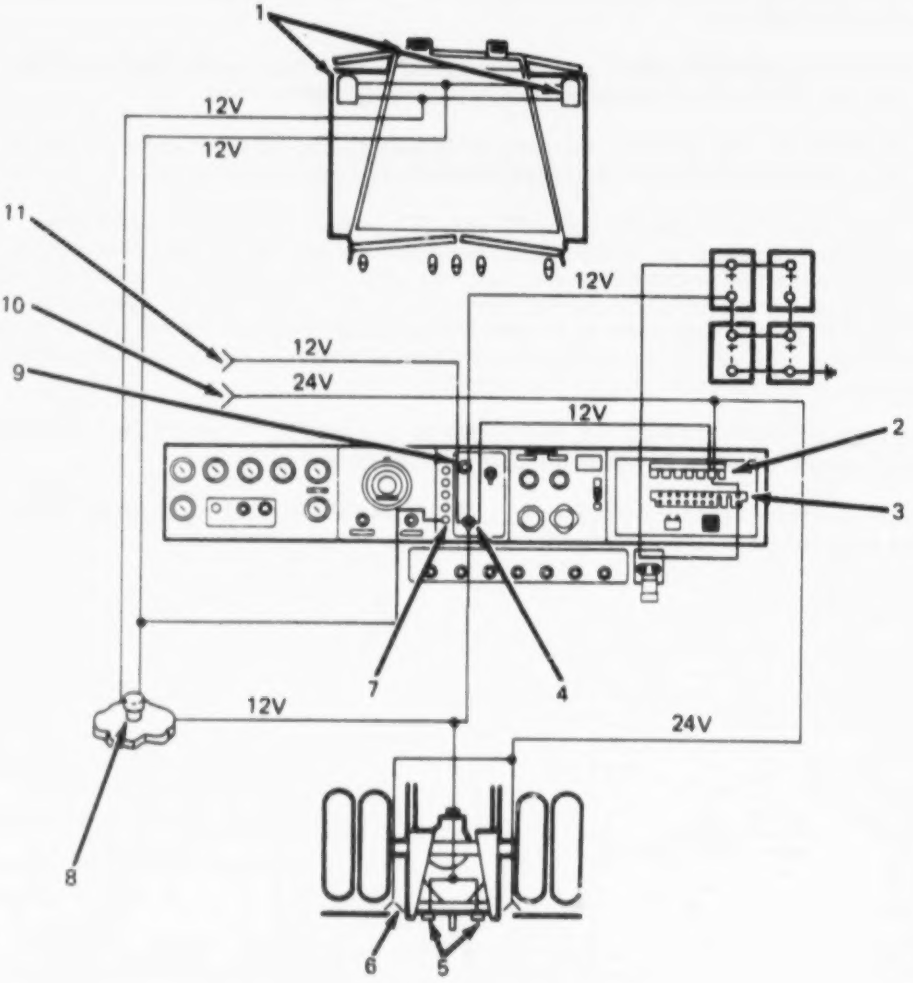
2. RELAY (K6). Normally open contacts; energized by 12-volt power from operation lamp switch when in NORMAL and headlamp switch is in on position. When relay is closed, 24-volt power is applied to trailer tail lamps, through circuit breaker and tractor receptacles.

3. CIRCUIT BREAKER (CB-8). Protects electrical components of 24-volt relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.

4. OPERATION LAMP SWITCH. Two-position safety switch for NORMAL and BLACKOUT modes of operation. To select mode, switch is pulled out and placed to either position. Set to NORMAL, 12-volt power from the lamp switch passes through operation lamp switch contacts to energize; tail lamps, headlamps (through dimmer switch), and coil of relay. Set to BLACKOUT, 12-volt power is removed from regular service lamps, electric horn, and backup alarm, while 12-volt power from the lamp switch is supplied through the switch to blackout tail lamps, marker lamps, and headlamp.

5. TAIL LAMPS. Each assembly contains two bulbs: A double-element bulb provides tail lamp, turn signal lamp, and stop lamp. A separate bulb is used for the backup lamp. The tail lamp circuit is energized through the operation lamp switch when headlamp switch is in either ON position. (The circuits for turn signals, stop lamps, and backup lamps are described in paragraph 2-46 and 2-47).

2-44. HEADLAMPS AND TAIL LAMPS (Continued).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2-44. HEADLAMPS AND TAIL LAMPS (Continued).

6. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor chassis mounted 12-pin connector to provide power to lunette-towed vehicles. (This receptacle is 12-volts on the M917).

7. HIGH-BEAM INDICATOR. When power is supplied to each high-beam filament in the headlamps, the high-beam indicator is illuminated via the same circuit.

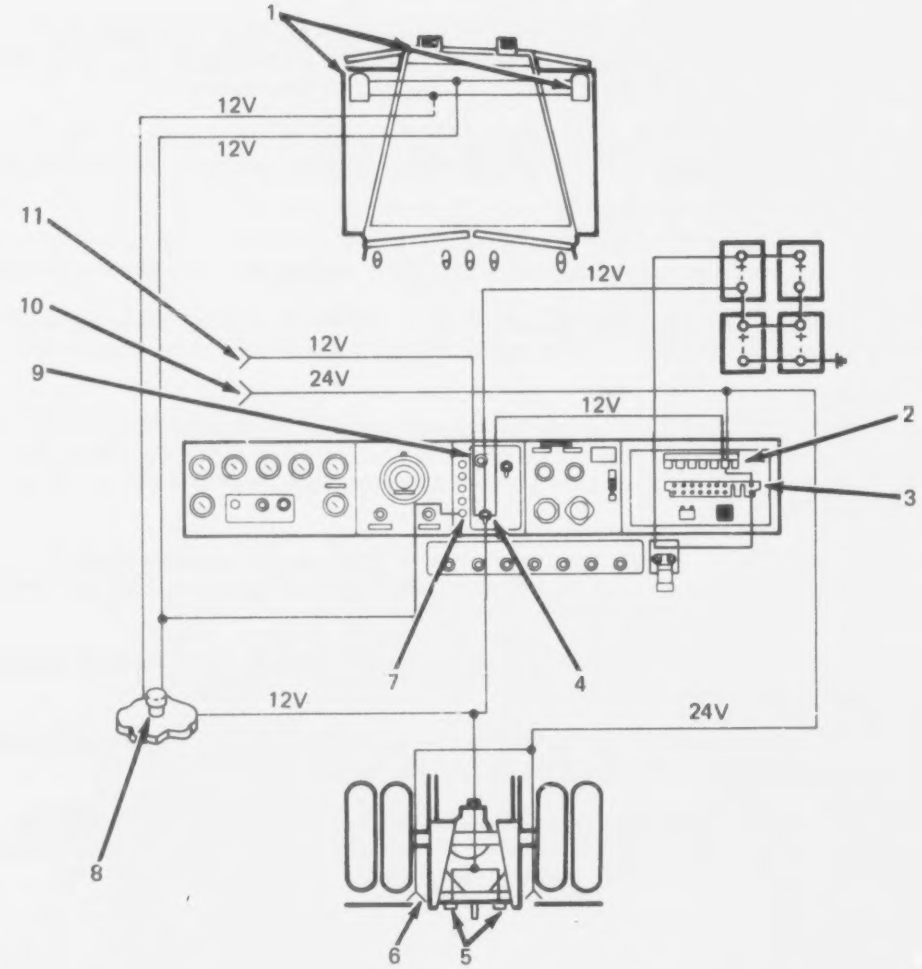
8. DIMMER SWITCH. Two-position, floor-mounted switch. The switch is always closed in one of two positions to energize either the low-beam or high-beam filament.

9. HEADLAMP SWITCH. Three-position with one OFF position and two ON positions. When the switch is pulled out to the second detented ON position, 12-volt power is supplied to the lighting systems through operation lamp switch. (The first detented position on the switch energizes the circuit for tail lamps, but not the headlamps.) The switch has an integral circuit breaker that opens to protect the complete circuit in the event of a "short" or faulty wiring. The circuit breaker is a recycling type; that is, it opens when the circuit is overloaded and cycles until the fault is removed.

10. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor chassis mounted 12-pin connector, provides 24 volts to trailer for lighting and tail lamps.

11. 12-VOLT TRAILER RECEPTACLE (M915, M916, and M920. Tractor mounted seven-pin connector provides 12 volts to trailer for lighting.

2-44. HEADLAMPS AND TAIL LAMPS (Continued).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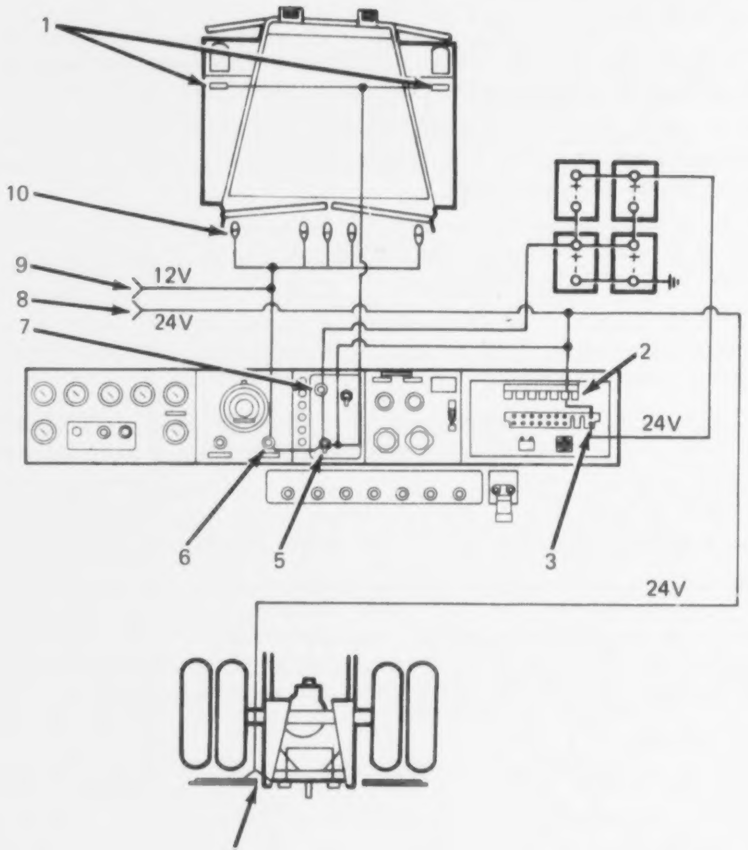
2-45. MARKER AND CLEARANCE LAMPS.

When headlamp switch is in either ON position, the operation lamp switch is in NORMAL position, 12-volt power is supplied to illuminate clearance lamps and front marker lamps as well as the trailer marker lamps on M915, M916, M917, and M920 vehicles. The trailer marker lamps receive power through receptacles mounted on the tractor chassis.

1. MARKER LAMP ASSEMBLY. Each assembly has two bulbs that illuminate whenever headlamp switch is ON and operation lamp switch is in NORMAL. One bulb is used as a marker lamp, and the other is for turn signals (para 2-46).
2. RELAY (K6). Normally open contacts; 12-volt power energizes relay when operation light switch is in NORMAL and headlamp switch is ON. When contacts of relay close, 24 volts from circuit breaker CB-8 is supplied to tractor chassis receptacles.
3. CIRCUIT BREAKER (CB-8). Protects electrical components for 24-volt tractor receptacle circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). 12-pin connector for 24-volt power used for lunette-towed vehicles. (This receptacle is 12-volts on the M917).
5. OPERATION LAMP SWITCH. With the switch set to NORMAL and the headlamp switch ON, 12-volt power is supplied to marker lamps, clearance lamps, and 12-volt tractor receptacle.
6. CLEARANCE LAMP SWITCH. Provides the capability of flashing the clearance lamps on the cab and the 12 volt supplied to the tractor receptacle, when switch is depressed and released. 12-volt power is supplied to the switch when headlamp switch is ON and operation switch is in NORMAL.
7. HEADLAMP SWITCH. Supplies 12-volt power, when in either ON position, through operation lamp switch in NORMAL, to clearance lamps, marker lamps, and 12-volt tractor receptacle.
8. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). 12-pin connector containing 24-volt circuit for trailer marker lamps.
9. 12-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Seven-pin connector containing 12-volt circuit for trailer clearance and marker lamps.
10. CLEARANCE LAMPS. Each unit has a replaceable single-element bulb that illuminates when headlight switch is in either ON position, and operation lamp switch is in NORMAL. The clearance lamps will flash when clearance lamp switch is depressed and released.

2-45. MARKER AND CLEARANCE LAMPS (Continued).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2-46. TURN SIGNAL AND HAZARD WARNING LAMPS.

When the operation lamp switch is in NORMAL position, battery power is applied to the turn signal control to illuminate right or left: front turn signals, rear turn signals as well as trailer turn signals on M915, M916, M917, and M920 vehicles through tractor-mounted receptacles. Also, the turn signal control contains a hazard warning switch, that allows the operator to flash all lamps in the turn signal system simultaneously.

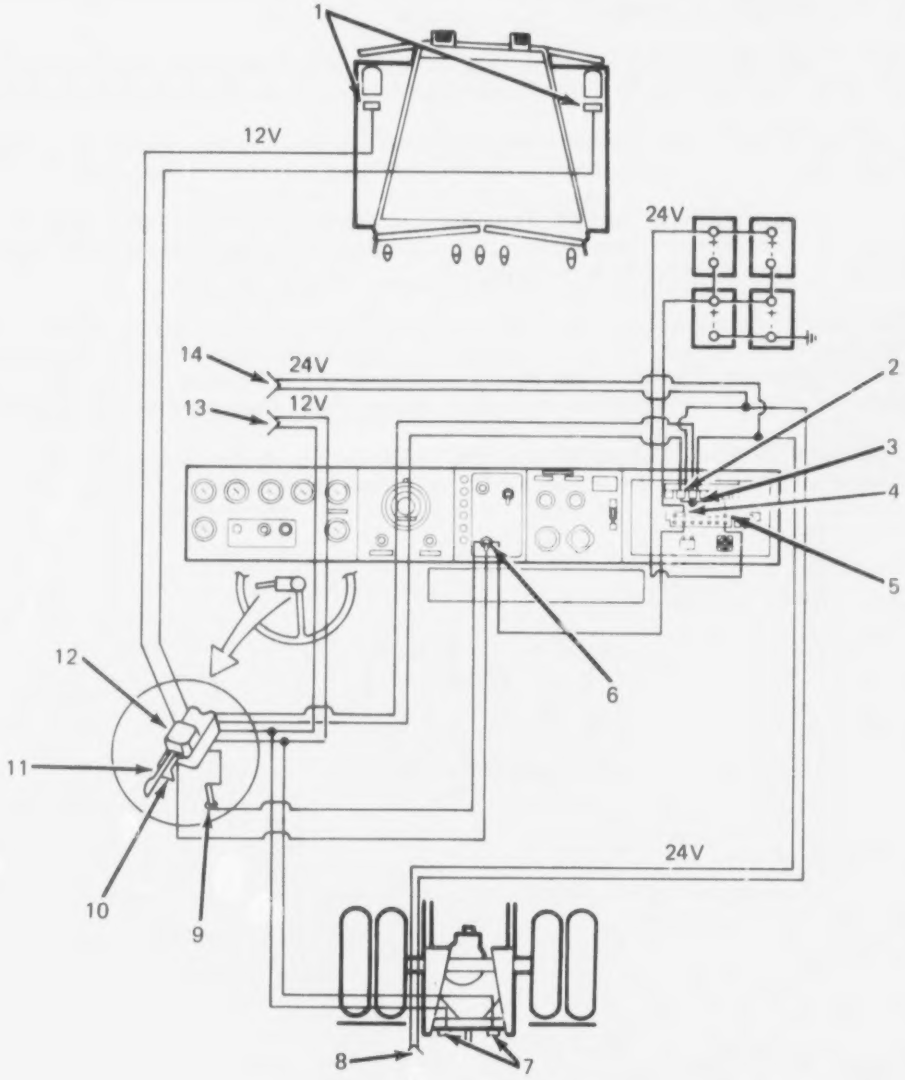
1. MARKER AND TURN SIGNAL LAMP ASSEMBLY. Each assembly has a replaceable single filament bulb that flashes when turn signal control or hazard warning switch is on.
2. RELAY (K2). Normally open contacts; closed by 12 volts from left turn signal control or hazard warning switch. When relay is energized, 24 volts is applied to tractor mounted receptacles for trailer left turn signals.
3. RELAY (K3). Normally open contacts; closed by 12 volts from right turn signal control or hazard warning switch. When relay is energized, 24 volts are applied to tractor mounted receptacles for trailer right turn signals.
4. CIRCUIT BREAKER (CB-2). Protects electrical components of flasher, turn signal control, and hazard warning switch circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. CIRCUIT BREAKER (CB-7). Protects electrical components of 24-volt relay and circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. OPERATION LAMP SWITCH. Two-position switch for normal and blackout modes of operation. When set to NORMAL, 12-volt battery power from circuit breaker (CB-2) passes through switch contacts to turn signal control, flasher unit, and hazard warning switch.
7. REAR TAIL LAMPS. Each assembly contains two bulbs; the tail lamp turn signal and stop lamp circuits all use the same bulb. When either the turn signal control or hazard warning switch are on, the turn signal and stop lamp filaments flash. When the turn signal control is activated, only the bulb on the side selected flashes. If the brakes are engaged at the same time that the hazard warning switch is on, both bulbs flash. When the brakes are engaged and the turn signal control is activated, one bulb will flash and the other bulbs will remain on constantly.
8. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor mounted 12-pin connector provides 24 volts power to lunette-towed vehicles. This receptacle is 12-volts on the M917.
9. FLASHER UNIT. This unit receives 12-volt power from operation lamp switch in NORMAL position and supplies this power alternately on and off to turn signal control or hazard warning switch when either one is engaged.
10. HAZARD WARNING SWITCH. When this switch is engaged, it receives 12-volt power from the operation lamp switch and energizes all components in the turn signal circuits simultaneously.
11. TURN SIGNAL CONTROL. When this control is engaged, it receives 12-volt power from flasher unit. (The flasher unit receives 12-volt power through operation lamp switch and circuit breaker CB-2.) Power is then supplied to:
    - *a.* Front left or right turn signals.
    - *b.* Rear left or right turn signals.
    - *c.* 12-volt Trailer Receptacle.
    - *d.* Relays K2 and K3 (To energize relay and supply power to both tractor mounted 24-volt receptacles for trailer turn signals.)

2-46. TURN SIGNAL AND HAZARD WARNING LAMPS (Continued).

12. INDICATOR LAMPS. Three bulbs to indicate left turn (green), right turn (green), or hazard (red). The bulbs are energized, by selection, with 12-volt power from the flasher unit.

13. 12-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor mounted seven-pin connector provides 12-volt power to the trailer turn signal lamps.

14. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor mounted 12-pin connector provides 24-volts power to the trailer turn signal lamps.



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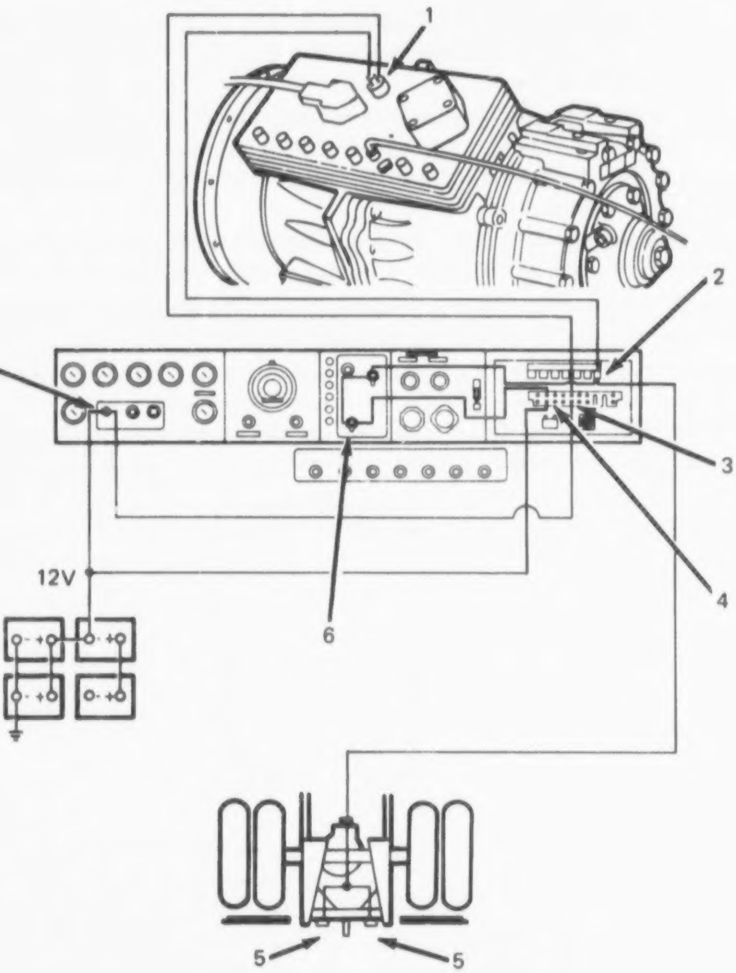
2-47. BACKUP LAMPS.

When the operator places the gear ratio selector lever in reverse position (R1 or R2), air pressure within the transmission closes backup switch. When operation lamp switch in NORMAL position and engine run switch ON, the circuit is energized to illuminate each backup bulb in tail lamp assembly.

1. BACKUP SWITCH. The switch is normally open. When closed, it receives 12-volt battery power through circuit breaker CB-5 and supplies power through normally closed contacts of relay K7 to energize backup lamps in tail lamp assemblies.
2. RELAY (K7). The relay is normally closed. When the operation lamp switch is placed to BLACKOUT position, 12-volt power is supplied to coil of K7, energizing the relay, and opens the contacts. This prevents the backup lamps from coming on whenever the operation lamp switch is in BLACKOUT mode.
3. CIRCUIT BREAKER (CB-5). Protects electrical components of backup switch circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. CIRCUIT BRAKER (CB-2). Protects electrical components of relay K7 circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. TAIL LAMP. Each assembly contains two bulbs: A tail, turn signal, and stop lamp bulb which contain two filaments and backup bulb which contains one filament. When the backup switch closes, the backup lamp illuminates.
6. OPERATION LAMP SWITCH. Two-position switch for NORMAL AND BLACKOUT modes of operation. In this circuit, the switch is used to prevent operation of the backup lamp. In BLACKOUT position, 12-volt power from circuit breaker CB-2 passes through the switch and energizes coil of relay K7, thus preventing the backup lamps from possibly coming on.
7. ENGINE RUN SWITCH. This switch controls 12-volt power to the backup switch through circuit breaker CB-5. When the switch is off the backup lamp circuit is de-energized.

2-47. BACKUP LAMPS (Continued).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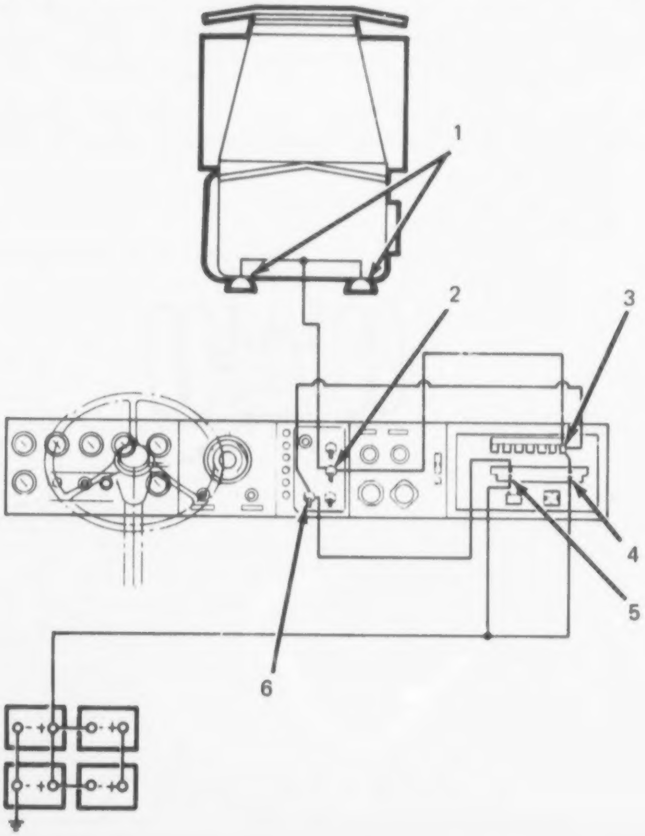
2-48. WORK LAMPS (M916 AND M920).

When the operation switch is in NORMAL position, and the operator places the work lamps switch to ON, 12-volt power is supplied to the work lamps on the M916 and M920 vehicles.

1. WORK LAMPS. Each assembly contains a single filament sealed beam unit. When the operation switch is in NORMAL and the work lamps switch is ON, the work lamps come on.
2. WORK LAMPS SWITCH. Two-position switch for ON and OFF mode of operation. When the switch is ON, 12-volt power is supplied through CB-2, normally closed contacts of relay K8, to the work lamps.
3. RELAY (K8). The relay is normally closed. When the operation switch is placed to BLACKOUT, 12-volt power is supplied to coil of K8, energizing the relay, and opens the contacts. This prevents the work lamps from coming on whenever the operation switch is in the BLACKOUT mode.
4. CIRCUIT BREAKER (CB-9). Protects electrical components of work lamps circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
5. CIRCUIT BREAKER (CB-2). Protects electrical components of relay K8 circuits by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. OPERATION SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. In this circuit, the switch is used to prevent operation of the work lamps. In BLACKOUT position, 12-volt power from circuit breaker CB-2 passes through the switch and energizes coil of relay K8, thus preventing the work lamps from being turned on.



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2-49. INSTRUMENT AND CAB DOME LAMPS.

a. With the headlamp switch in either ON position, the instrument lamps illuminate. The dome lamp illuminates whenever the dome lamp switch is ON.

b. The low air pressure warning lamp on left-hand cluster, clearance lamp on center cluster and six indicator lamps on the right-hand cluster are described with their respective circuits in this chapter. That is, the high engine temperature warning indicator is described with the cooling system; low oil pressure warning indicator with the oil system, etc., (see table of contents).

1. LEFT HAND INSTRUMENT CLUSTER. The instrument gage lamps on this panel receive 12-volt power from headlamp switch when it is in either ON position. Each gage contains its own illumination bulb.

2. CENTER INSTRUMENT CLUSTER. The center cluster contains the tachograph which is illuminated when the headlamp switch is in either ON position.

3. HEADLAMP SWITCH. Three-position switch with one OFF position and two ON positions. In either ON position, 12-volt battery power passes through the switch to energize the following lamp in this circuit:

   a. Instrument lamps on left-hand instrument cluster.

   b. Clearance switch and tachograph illumination lamps on center cluster.

   c. Switch and functional indicators on right-hand instrument cluster.

   d. Illumination lamps on heater panel.

   e. Illumination lamps on ratio selector.

The headlamp switch has a variable rheostat that allows the operator to adjust the brightness of all lamps in this circuit by turning the switch knob.

4. RIGHT-HAND INSTRUMENT CLUSTER. The instrument lamps on this cluster receive 12-volt power from the headlamp switch and illuminate the windshield wiper, and windshield washer indicator.

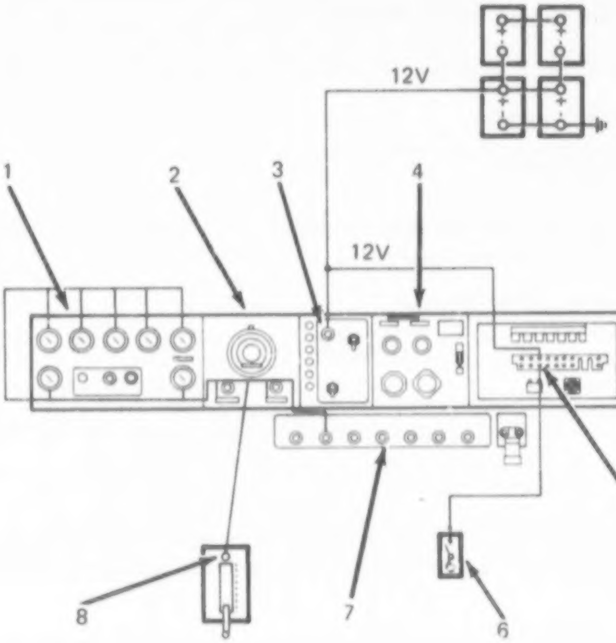
5. CIRCUIT BREAKER (CB-3). Protects electrical components of dome lamp circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.

6. DOME LAMP AND SWITCH ASSEMBLY. When the assembly integral switch is ON, the lamp is energized by 12-volt battery power through circuit breaker (CB-3).

7. HEATER PANEL LAMPS. When the headlamp switch is in either ON position, the lamps are energized by 12-volt battery power and illuminates the heater control panel.

8. GEAR RATIO SELECTOR LAMP. When the headlamp switch is in either ON position, the lamp is energized by 12-volt battery power and illuminates the gear ratio selector.

2-49. INSTRUMENT AND CAB DOME LAMPS (Continued).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Section XVIII BLACKOUT LIGHTING SYSTEM

2-50. INTRODUCTION.

The blackout lighting system prevents operation of the horn, backup alarm, and all service lighting (para 2-43), except instrument lamps, and dome lamp. The system provides the following intensity lighting for blackout operation on all M915 series vehicles:

a. One headlamp.

b. Two front marker lamps.

c. Two tail and stop lamps.

d. Trailer tail, stop, and marker lamps on M915, M916, M917, and M920 at the 12-pin trailer receptacles.

2-51. BLACKOUT LIGHTING SYSTEM.

NOTE

In reading the following component description you should remember that the OPERATION switch is in BLACKOUT position.

1. BLACKOUT HEADLAMP. The lamp consists of a single, replaceable sealed beam unit. With the headlamp switch in the ON position, the blackout headlamp is energized by a 12-volt battery power.
2. BLACKOUT MARKER LAMPS. Each lamp consists of a replaceable bulb which is energized by 12-volt battery power when the headlamp switch is in either ON position.
3. CIRCUIT BREAKER (CB-8). Protects electrical components for 24-volt blackout stop lamp relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. RELAY (K5). Normally open contacts: Closed by 12-volt power when the operation switch is in BLACKOUT. When relay is energized, 24-volt power is supplied from circuit breaker CB-7 through 24-volt trailer receptacle for blackout tail lamps.
5. CIRCUIT BREAKER (CB-7). Protects electrical components for 24-volt blackout tail lamp relay circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
6. RELAY (K4). Normally open contacts: Closed by 12-volt power when the operation switch is in BLACKOUT. When relay is energized, 24-volt power is supplied from circuit breaker CB-3 through 24-volt trailer receptacle.
7. CIRCUIT BREAKER (CB-1). Protects electrical components for stop switch circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
8. 24-VOLT TRAILER RECEPTACLE (M915, M916, M917, and M920). Tractor mounted 12-pin connector to provide 24-volt battery power to lunette-towed trailers for blackout tail and stop lamps. This receptacle is 12-volts on M917.

2-51. BLACKOUT LIGHTING SYSTEM (Continued).

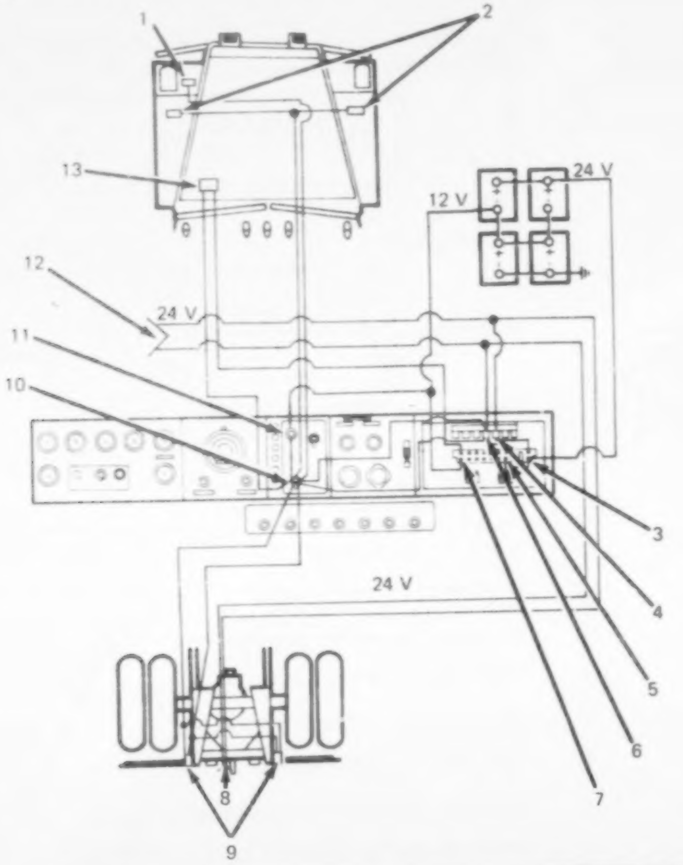
9. REAR BLACKOUT LAMPS. Contains the bulbs for blackout tail and stop lamps. The blackout tail lamp is energized when the operation switch is in BLACKOUT and the headlamp switch is in either ON position. The stop lamps are energized when the stop lamp switch is actuated.

10. OPERATION LAMP SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. With this switch in the BLACKOUT position, 12-volt battery power is available from the headlamp switch to energize: blackout headlamp, marker lamps, tail lamps, and relay K4 and K5.

11. HEADLAMP SWITCH. Three-position switch with one OFF position and two ON positions. The switch supplies 12-volt battery power to the OPERATION lamp switch.

12. 24-VOLT TRAILER RECEPTACLE (M915, M916, and M920). Tractor mounted 12-pin connector to provide 24-volt battery power to trailer blackout tail and stop lamps.

13. STOP LAMP SWITCH. The stop lamp switch is part of the brake system and is shown and described in paragraph 2-63. In this circuit, the switch receives 12-volt battery power from circuit breaker CB-1. When the brakes are engaged, the switch closes and supplies 12-volt power through the operation lamp switch to energize relay K4. With this relay closed, 24-volt battery power is supplied through circuit breaker CB-8 to the 24-volt tractor mounted trailer receptacles.



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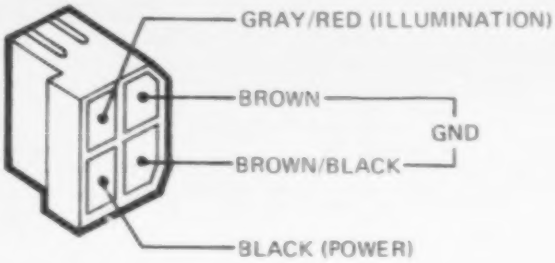
Section XIX INSTRUMENTATION

2-52. INTRODUCTION.

Table 2-1 lists the instruments and major input connections for all M915 thru M920 vehicles. Connections for instrument gage lamps have been omitted. (See wiring diagram in Appendix D.) You will find an illustration or schematic diagram for each listed instrument by using the Reference/Illustration column of the table.

Table 2-1. Instruments.

Instrument	Input Connections	Reference Illustration (Para)
TACHOGRAPH	Tachometer cable from fuel pump on engine provides engine speed input. Speed cable from transmission provides vehicle speed input.  GRAY/RED (ILLUMINATION) BROWN GND BROWN/BLACK BLACK (POWER)	2-7 2-12
FRONT WHEEL BRAKE AIR PRESSURE GAGE	Pneumatic line from front brake system.	2-62
REAR WHEEL BRAKE AIR PRESSURE GAGE	Pneumatic line from rear brake system.	2-62
PUSHER AXLE AIR PRESSURE GAGE (M917, M919, M920)	Pneumatic line from air bag pressure system.	2-16
VOLTMETER	Power wire from circuit breaker.	2-42
FUEL GAGE	Signal wire from sending unit in fuel tank. Power wire from circuit breaker.	2-24
OIL PRESSURE GAGE	Signal wire from sending unit on engine. Power wire from circuit breaker.	2-28
WATER TEMPERATURE GAGE	Signal wire from temperature transmitter on engine. Power wire from circuit breaker.	2-33
TRANSMISSION OIL TEMPERATURE	Signal wire from sending unit on transmission. Power wire from circuit breaker.	2-12

TA 074584

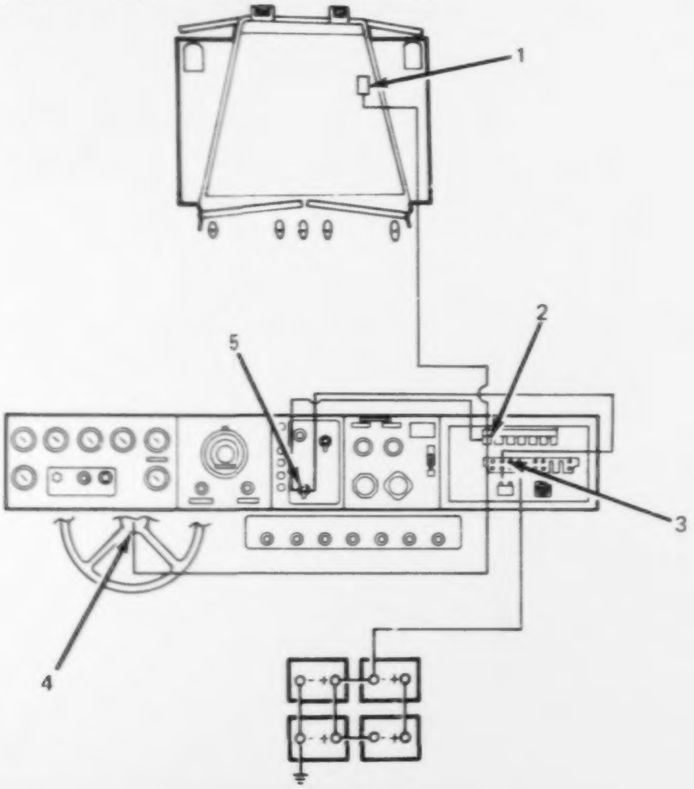
Section XX ELECTRIC HORN

2-53. INTRODUCTION.

The electric horn circuit is identical on all M915 thru M920 vehicles.

2-54. ELECTRIC HORN.

1. ELECTRIC HORN. The horn is energized by 12-volt battery power when horn button is depressed and operation lamp switch is in NORMAL position.
2. RELAY (K1). When horn button is depressed, coil of relay is energized by 12-volt battery power from circuit breaker. With relay de-energized, 12 volts are supplied from a second lead from circuit breaker, through operation lamp switch, through contacts of relay to horn.
3. CIRCUIT BREAKER (CB-2) Protects electrical components of horn circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
4. HORN BUTTON. Pushing this button activates the horn circuit and energizes the horn.
5. OPERATION LAMP SWITCH. Two-position switch for normal and blackout modes of operation. With switch set to NORMAL and horn button depressed, 12-volt battery power from circuit breaker passes through switch contacts to relay.



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Section XXI CAB HEATING AND VENTILATING SYSTEMS

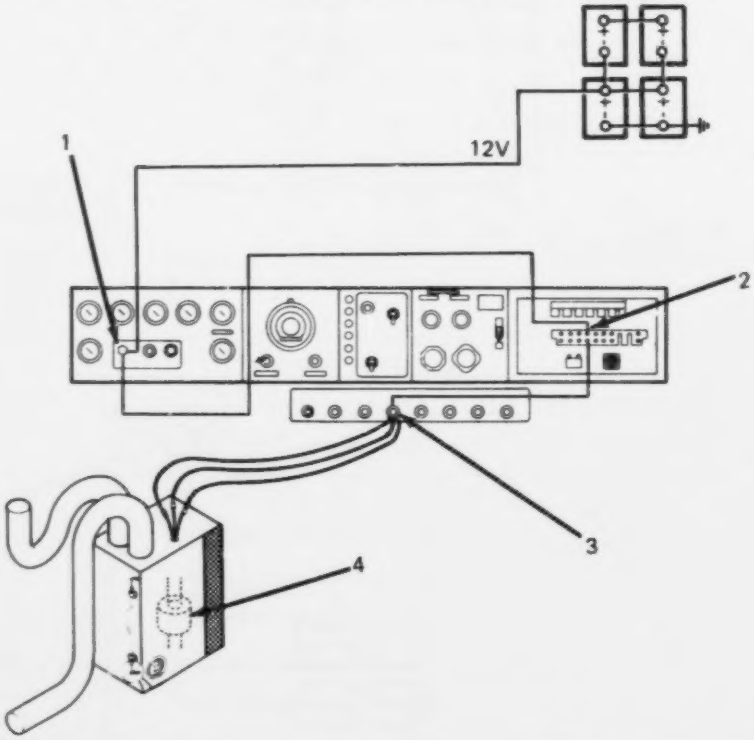
2-55. INTRODUCTION.

The cab heating and ventilating system are identical in all M915 thru M920 vehicles. This system is comprised of:

a. Heater Electrical Control
b. Heater Water Controls
c. Ventilating System

2-56. HEATER ELECTRICAL CONTROLS.

1. ENGINE RUN SWITCH. Controls 12-volt battery power to heater fan switch. When switch is OFF, fan cannot be actuated.
2. CIRCUIT BREAKER (CB-4). Protects electrical components of heater fan switch by opening when load exceeds 20 amps. Automatically recycles until overload is removed.
3. FAN SWITCH. Four-position switch with three ON positions. Supplies 12-volt battery power through circuit breaker (CB-4) to motor. Current flow increases as switch is moved from LOW to MEDIUM to HIGH.
4. MOTOR. Powers heater fan. Actuated by current from heater fan switch.



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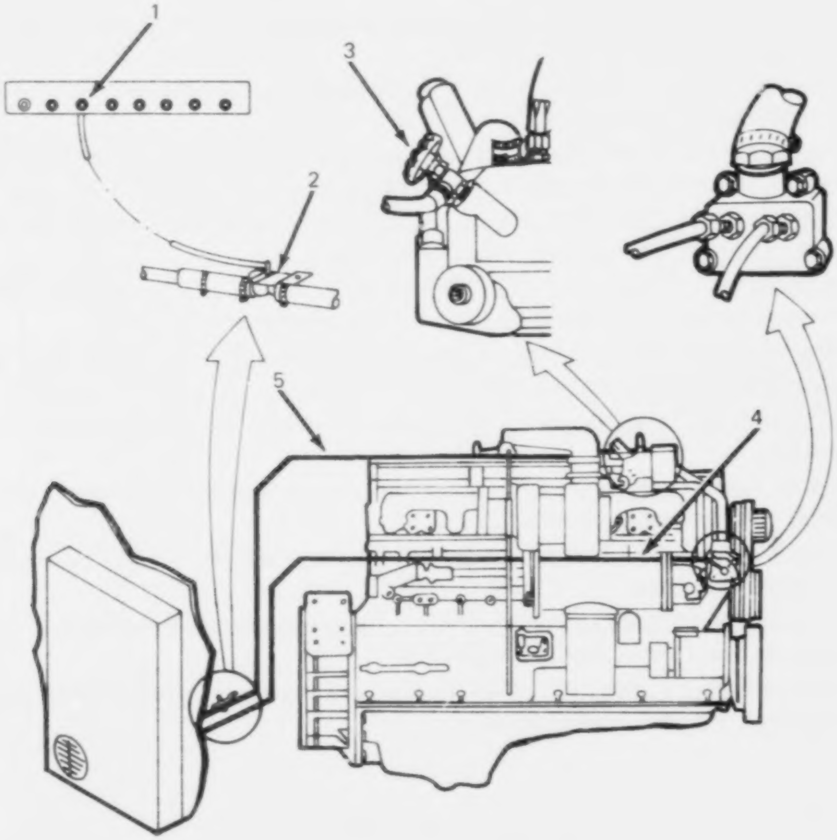
2-57. HEATER WATER CONTROLS.

1. HEATER KNOB. Allows operator to regulate flow of coolant through control valve.
2. CONTROL VALVE. Controls heater temperature by regulating flow of hot water to heater core. Cable from heater knob in cab opens valve as knob is pulled out. Valve is spring-loaded to close as knob is pushed in. Some water passes through this valve even when it is fully closed.
3. HEATER SHUTOFF VALVE. Supplies coolant to control valve. Manual shutoff handle allows complete cutoff of coolant flow to heater.
4. HEATER RETURN TUBE. Carries coolant from heater to water pump.
5. HEATER SUPPLY TUBE. Carries coolant from control valve to heater.



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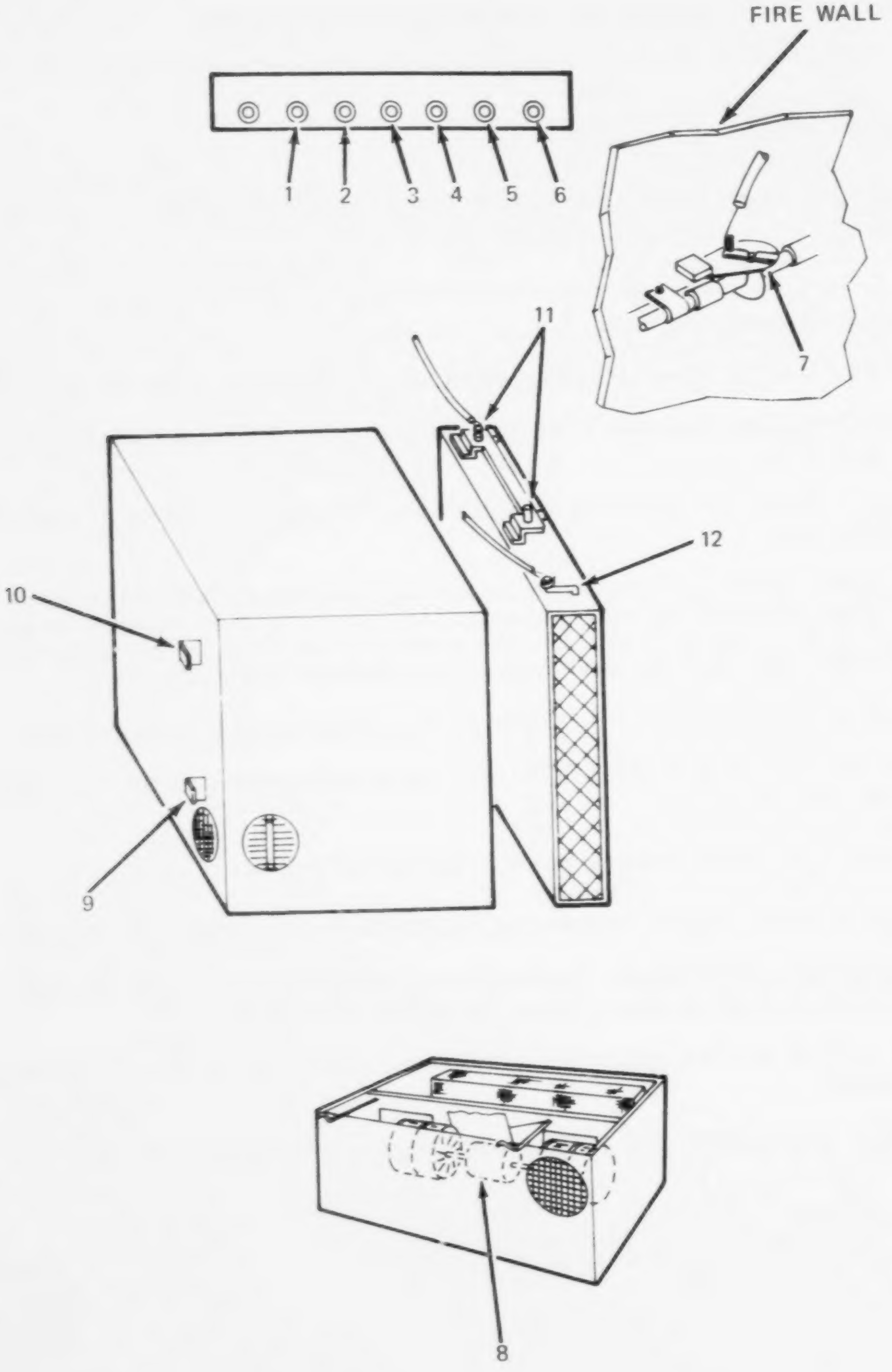
2-58. VENTILATING SYSTEM.

NOTE

The driver's fresh air vent is a manually operated unit mounted in the lower cowl side of the cab. It is not serviced at the organizational level.

1. HEAT CONTROL KNOB. Allows driver to heat cab. Connected by cable to water control valve.
2. FAN CONTROL SWITCH. Allows driver to control amount of heat in cab. Connected by electrical wires to heater motor.
3. DRIVER HEAT KNOB. Allows driver to open or close heat vent for his side of cab. Connected by cable to heat control lever.
4. PASSENGER HEAT KNOB. Allows passenger to open or close heat vent for his side of cab. Connected by cable to heat control lever.
5. FRESH VENT CONTROL KNOB. Allows driver to control fresh air vent on passenger side. Connected by cable to vent control lever.
6. RECIRCULATION VENT CONTROL KNOB. Allows driver to recirculate cab air through heater. Connected by cable to recirculation control lever.
7. WATER CONTROL VALVE. Allows flow of water through heater core. Actuated by cable from heat control knob.
8. HEATER MOTOR. Drives fan for distributing heat. Actuated by fan control switch.
9. HEAT CONTROL LEVER. Actuates flap at heat vent for passenger. Connected by cable to passenger pull knob.
10. HEAT CONTROL LEVER. Actuates flap at heat vent for driver. Connected by cable to driver pull knob.
11. RECIRCULATION CONTROL LEVER. Actuates shutter inside heater. Connected by cable to recirculation vent control knob.
12. FRESH VENT CONTROL LEVER. Actuates shutters at fresh air vent. Connected by cable to fresh vent control knob.

2-58. VENTILATING SYSTEM (Continued).


FIRE WALL
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TA 074588

Section XXII COMPRESSED AIR SYSTEM

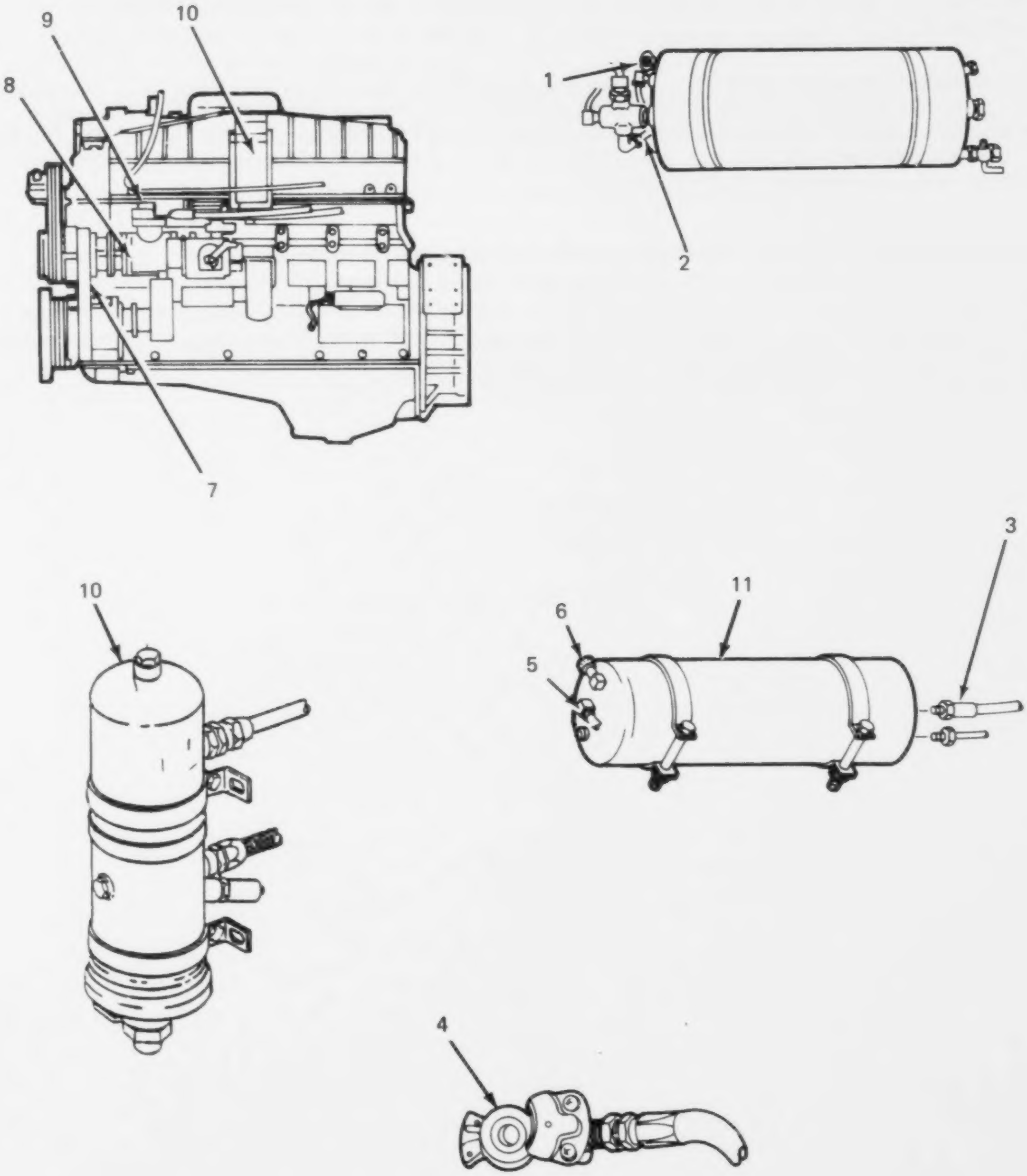
2-59. INTRODUCTION.

The compressed air supply system is the same in all M915 thru M920 vehicles.

2-60. COMPRESSED AIR SYSTEM.

1. SAFETY VALVE. Vents air when pressure in supply tank rises above 150 psi (1,034 kPa).
2. TRANSMISSION CONTROL LINE. Air supply to ratio selector valve in cab. (see para 2-12).
3. CHECK VALVE. One-way valve prevents air from flowing out of supply air reservoir back to compressor.
4. EXTERNAL AIR COUPLINGS. Tractor to trailer couplings are provided on M915, M916, and M920 models. All models are equipped with front external air couplings for brake use when the vehicle must be towed. Rear external air couplings are provided on M915, M916, M917 and M920 for brake actuation of a disabled vehicle being towed.
5. PRIMARY RESERVOIR LINE. Carries air from primary tank to supply reservoir.
6. TIRE INFLATION AIR HOSE FITTING. Used in conjunction with the tire inflation air hose and chuck.
7. ACCESSORY DRIVE. Provides power to operate compressor.
8. COMPRESSOR. Draws air from cleaner, compresses it, and directs it to supply air reservoir.
9. COMPRESSOR GOVERNOR. Opens unloading valve to vent air before compression when pressure in supply tank is above 105-125 psi (724-826 kPa).
10. AIR DRYER. Air from compressor is dried and contaminants are removed before entering the system.
11. SUPPLY AIR RESERVOIR. Receives compressed air from compressor.

2-60. COMPRESSED AIR SYSTEM (Continued).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TA 237212 ■

Section XXIII BRAKE SYSTEM

2-61. INTRODUCTION.

The brakes on all M915 thru M920 vehicles are actuated by the compressed air system (para 2-60).

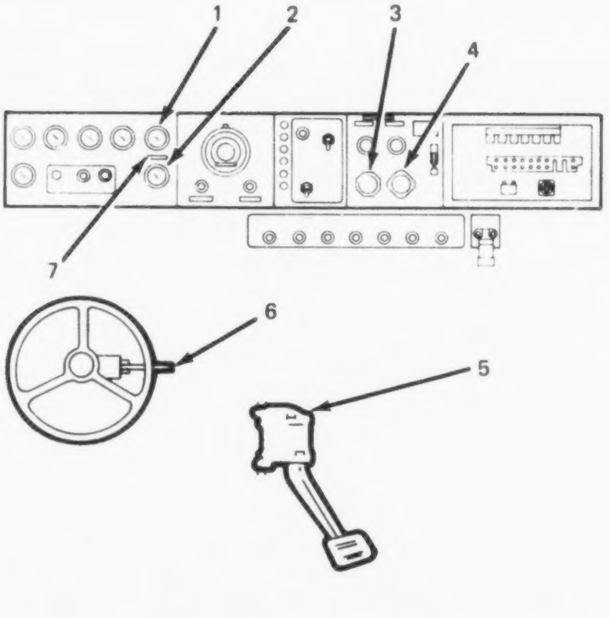
The system is comprised basically of valves and controls for dual air brakes (service and emergency). "S"-type cam brakes with two air chambers are used in the rear on all models and on the pusher axle (Models M917, M919 and M920). Wedge-type brakes with one air chamber (M916 thru M920) or two air chambers (M915 only), are used in the front. (See illustration and description of each type of brake in paragraphs 2-65 thru 2-70).

(Refer to section XXIV for description of auxiliary air powered systems.)

This section is divided into three parts: controls, switches and indicators, and system components. Since the number of air reservoirs and the arrangement of valves and lines differs with each vehicle model, a separate arrangement drawing is provided for each in paragraphs 2-65 thru 2-70. (See Appendix D for a piping schematic diagram of each vehicle model.)

2-62. CONTROLS.

1. REAR AIR PRESSURE GAGE. Direct pressure gage indicates air pressure in rear service reservoir.
2. FRONT AIR PRESSURE GAGE. Direct pressure gage indicates air pressure in front service reservoir.
3. TRAILER EMERGENCY BRAKE VALVE. In applied position, supplies pressure to trailer service and emergency air lines.
4. PARKING BRAKE VALVE. Normally supplies pressure holding spring brakes in compressed position. When knob is pulled out, valve exhausts air pressure, allowing spring brakes to apply.
5. DUAL BRAKE VALVE. Applies front and rear service brakes at the same time when brake pedal is pushed.
6. TRAILER BRAKE HAND CONTROL (M915, M916 and M920). Applies trailer brakes only. Opens connection between air supply reservoir and trailer service brake lines as it is turned clockwise.
7. LOW AIR PRESSURE WARNING INDICATOR (12-volt). Circuit normally held open by air pressure. Closes to activate control panel indicator when pressure drops below 70 psi.



TA 074590

2-63. BRAKE SWITCHES AND INDICATORS.

1. STOP LAMP SWITCH. Normally open air actuated switch, which closes when brakes are actuated. The switch receives 12-volt battery power from circuit breaker CB-1 and supplies this power through the operation switch in NORMAL position, turn signal control to the tractor tail stop lamps. Also, with switch closed, 12-volt battery power is routed through the operation switch to the 12-volt trailer receptacle.

2. PARK BRAKE INDICATOR. Illuminates when the park brakes are applied. Indicator receives 12-volt battery power through engine run switch in ON position, circuit breaker CB-6, and actuated parking brake switch.

3. OPERATION LAMP SWITCH. Two-position switch for NORMAL and BLACKOUT modes of operation. With the switch set to NORMAL, 12-volt battery power is received from closed stop lamp switch, and circuit breaker CB-1. This 12-volt power is supplied through the turn signal control to the tractor tail stop lamp. 12-volt power is also supplied to the 12-volt trailer receptacle.

4. PARK BRAKE SWITCH. Normally open, air actuated switch on parking brake (para 2-62). Closes to energize park brake indicator when parking brakes are actuated.

5. CIRCUIT BREAKER (CB-6). Protects electrical components of parking brake circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.

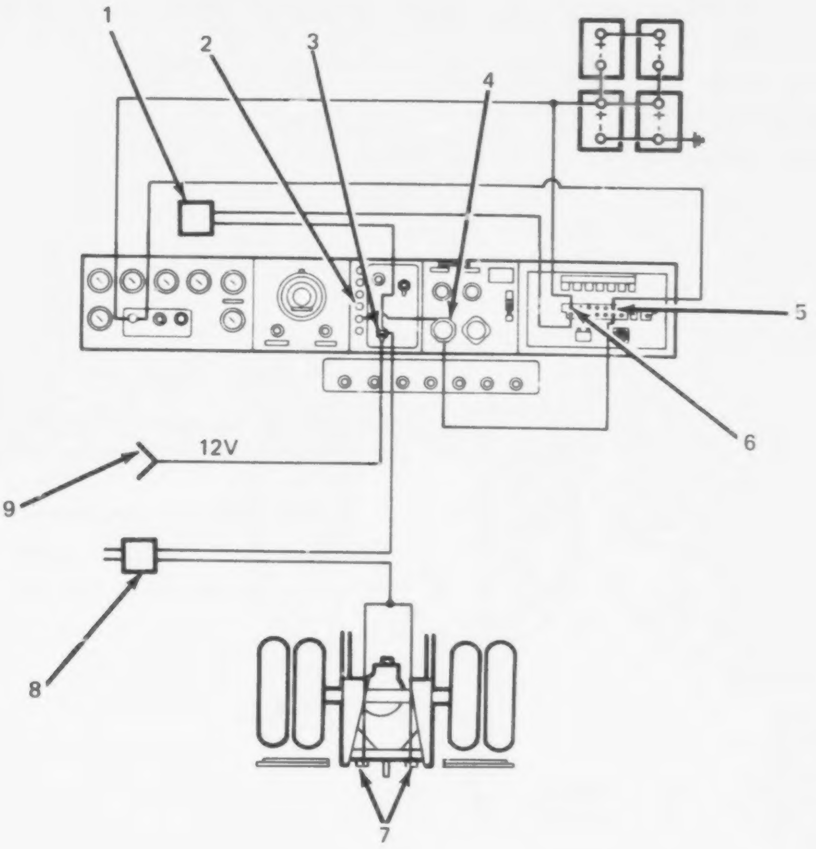
6. CIRCUIT BREAKER (CB-1). Protects electrical components of stop lamp circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.

7. STOP TAIL LAMPS. Unit contains two bulbs, a single-filament bulb for backup, and a two-filament bulb for tail, turn signal, and stop lamps. The stop lamps receive 12-volt power through circuit breaker CB-1, closed stop lamp switch, closed contacts of operation switch, and the turn signal control.

8. CIRCUIT BREAKER (CB-6). Protects electrical components of parking brake circuit by opening when load exceeds 20 amps. Automatically recycles until overload is removed.

9. 12-VOLT TRAILER RECEPTACLE. When the stop lamp switch is closed and the operation switch is in NORMAL, 12-volt battery power is supplied to the tractor mounted receptacle for trailer stop lamps.

2-63. BRAKE SWITCHES AND INDICATORS (Continued).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TA 074591

2-64. SYSTEM COMPONENTS.

This paragraph describes and illustrates the major components that comprise the brake system in the M915 series vehicles.

a. Wedge Brakes.

b. "S"-Type Cam Brake.

c. Air Chambers.

d. Reserve Air Reservoir. (Supply reservoir is described in compressed air system, para 2-60).

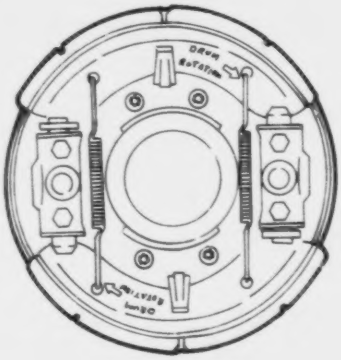
e. Relay Valve.

f. Double-Check Valve.

g. Quick-Release Valve.

h. Limiting Valve.

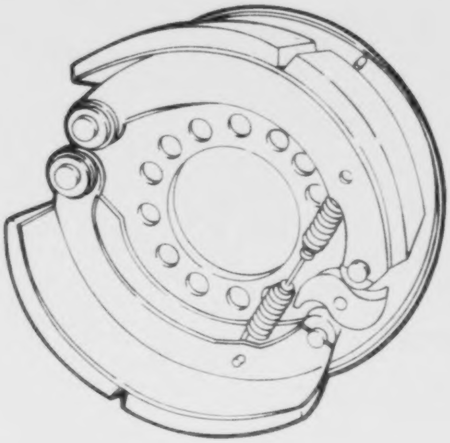
A. WEDGE BRAKES. Used on front wheels of all six vehicle models.



TA 074592

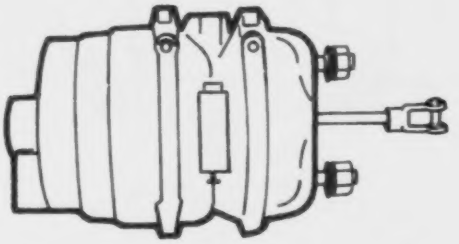
2-64. SYSTEM COMPONENTS (Continued).

B. "S"-TYPE CAM BRAKE. Used on rear tandem axle inside wheels on all six models and pusher axle wheel on M917, M919 and M920.



C. AIR CHAMBER. Two used on each rear tandem axle of all vehicle models. Spring loaded brake applies when air pressure drops due to:

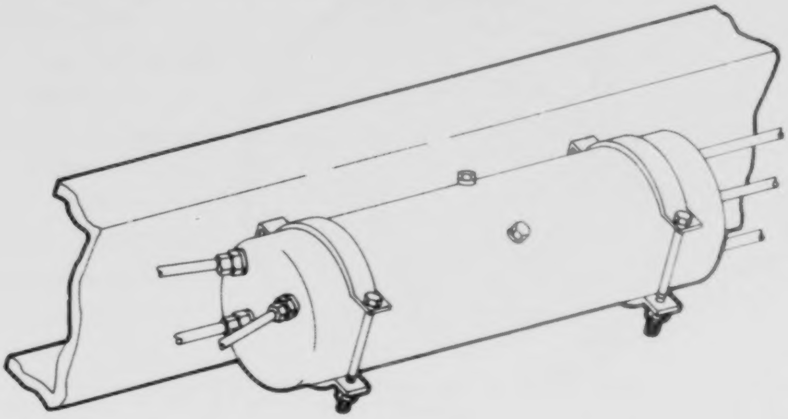
1. compressed air system failure.
2. engine shutdown.
3. application of park brakes.



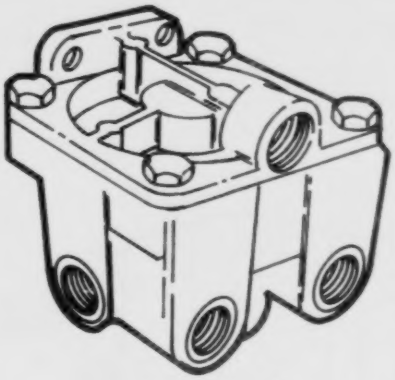
TA 074593

2-64. SYSTEM COMPONENTS (Continued).

D. RESERVE AIR RESERVOIR. Two reserve air reservoirs are used on M915, M916, and M918; three on M917, M919, and M920. (See illustrations in para 2-65 thru 2-70.)



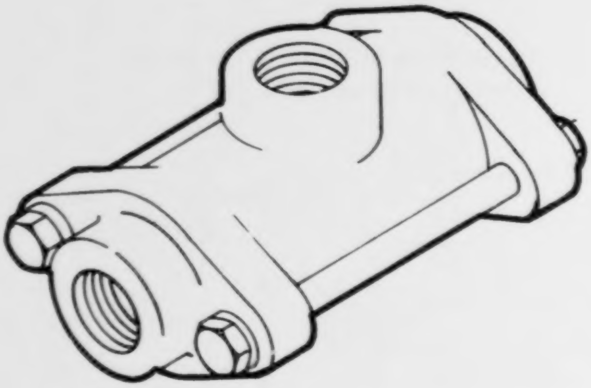
E. RELAY VALVE. Pressure from cab brake valves control flow of air from brake reservoirs to rear axle brake chambers. Applies rear brakes faster and more firmly than if they were actuated directly by air pressure in control lines from cab.



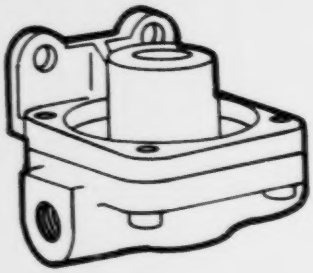
TA 074594

2-64. SYSTEM COMPONENTS (Continued).

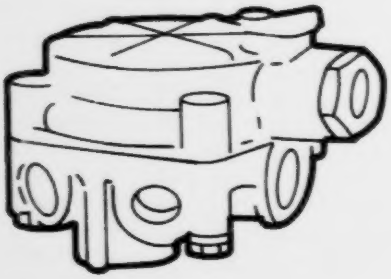
F. DOUBLE-CHECK VALVE. Directs air flow from either of two inlet lines into a single outlet line.



G. QUICK-RELEASE VALVE. Vents air from rear brake system when operator releases brake.



H. LIMITING VALVE. Directs air pressure from a single incoming line to brakes on both sides of truck.

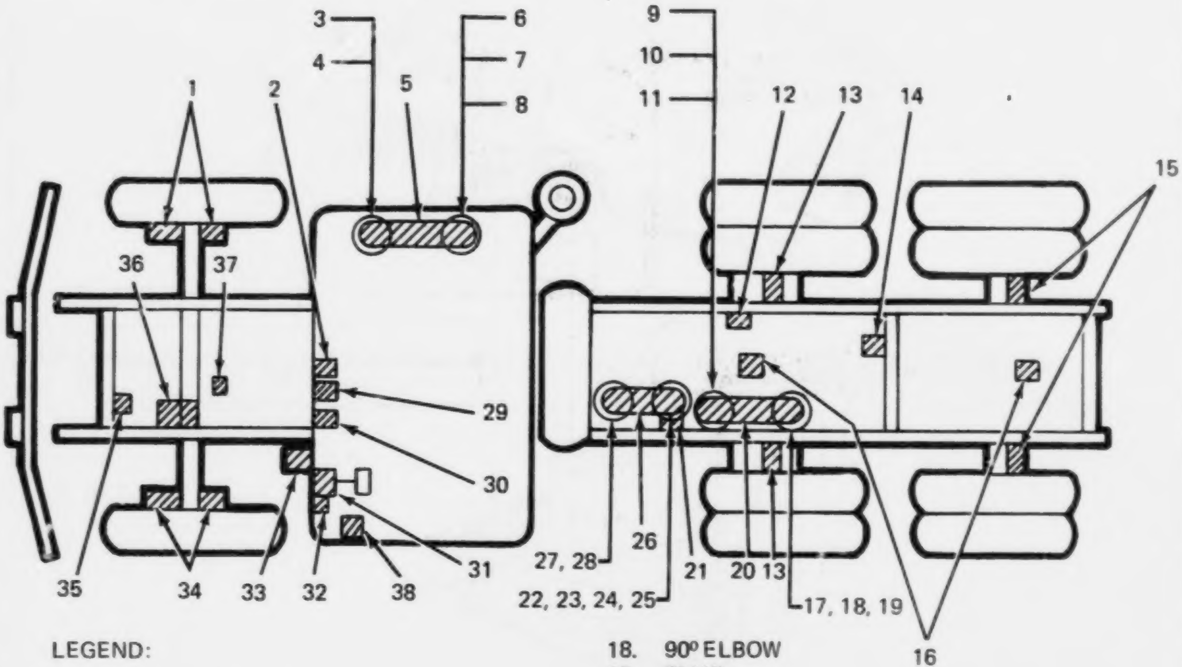


TA 074595

2-65. AIR SYSTEM ARRANGEMENT (M915).

NOTE

The components shown below are described in paragraph 2-64.

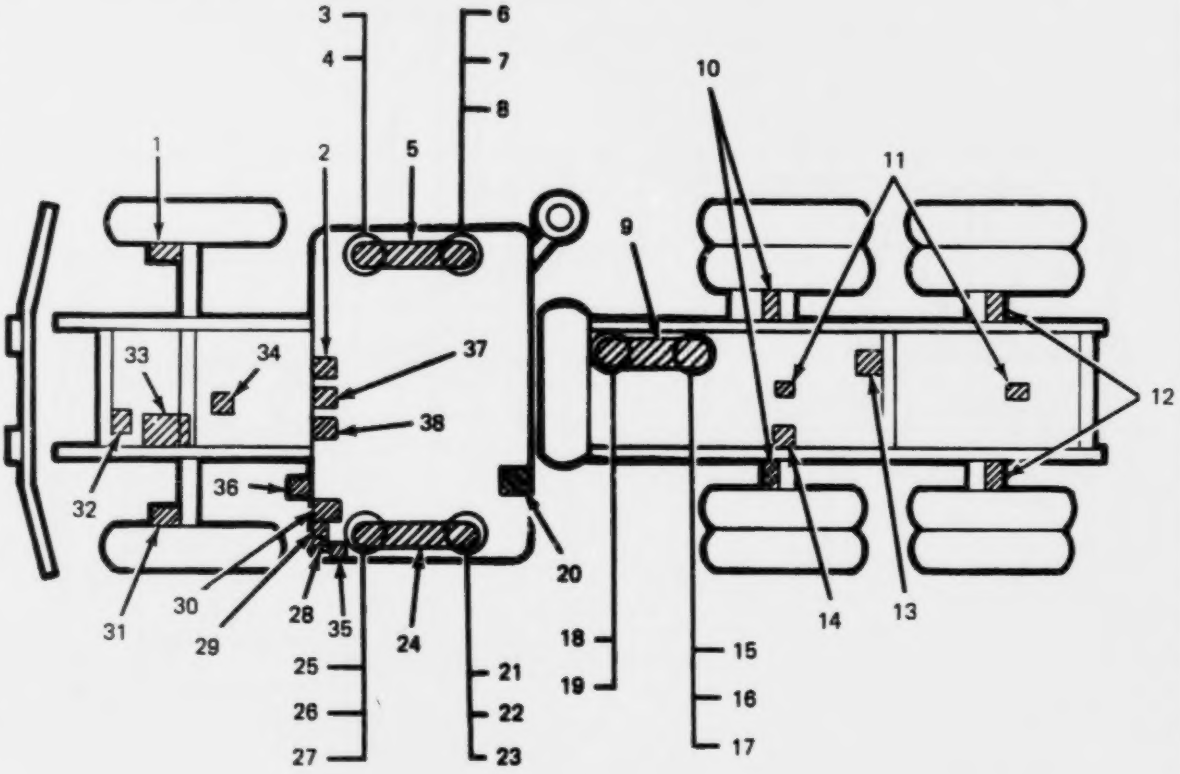


LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)
2. PARKING BRAKE VALVE
3. DRAIN COCK
4. PLUG (2)
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90° CHECK VALVE
8. 90° ELBOW
9. DRAIN COCK
10. 45° ELBOW
11. 45° CHECK VALVE
12. QUICK RELEASE/DOUBLE CHECK VALVE
13. SPRING AND SERVICE BRAKE CHAMBER (FORWARD-REAR) (2)
14. RELAY VALVE
15. SPRING AND SERVICE BRAKE CHAMBER (REAR-REAR) (2)
16. QUICK RELEASE VALVE
17. ADAPTER
18. 90° ELBOW
19. PLUG
20. PRIMARY RESERVOIR
21. TRACTOR PROTECTION VALVE
22. DRAIN COCK
23. 90° ELBOW
24. AIR HOSE COUPLING
25. SAFETY VALVE
26. SUPPLY RESERVOIR
27. 90° ELBOW (2)
28. CHECK VALVE
29. TRAILER SUPPLY VALVE
30. TRAILER HAND CONTROL BRAKE VALVE
31. DUAL BRAKE VALVE
32. DOUBLE CHECK VALVE
33. DOUBLE CHECK AND STOPLAMP VALVE
34. WEDGE BRAKE AIR CHAMBER (2)
35. LIMITING VALVE
36. AIR COMPRESSOR/GOVERNOR
37. CHECK VALVE
38. AIR DRYER

TA 237213

2-66. AIR SYSTEM ARRANGEMENT (M916) .

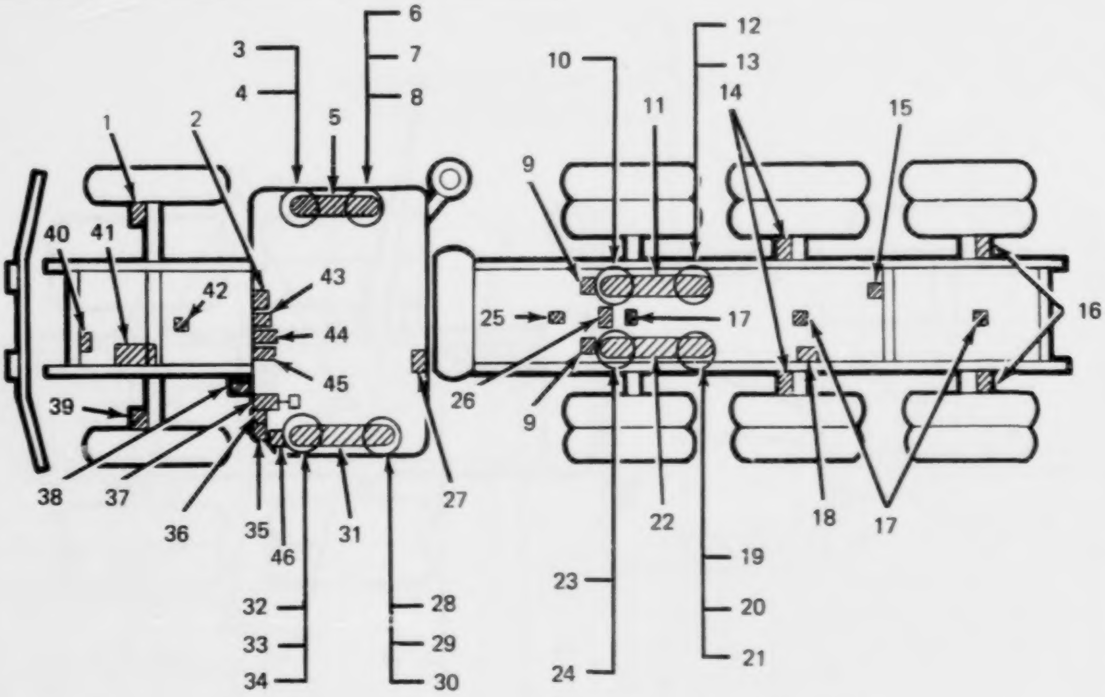


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90°CHECK VALVE
8. 90° ELBOW
9. PRIMARY RESERVOIR
10. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
11. QUICK RELEASE VALVE (2)
12. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
13. RELAY VALVE
14. QUICK RELEASE AND DOUBLE CHECK VALVE
15. DRAIN COCK
16. 90°ELBOW
17. PLUG
18. ADAPTER (2)
19. CHECK VALVE
20. TRACTOR PROTECTION VALVE
21. AIR HOSE COUPLING
22. 90°ELBOW
23. DRAIN COCK
24. SUPPLY RESERVOIR
25. SAFETY VALVE
26. ADAPTER
27. CHECK VALVE
28. SPRING BRAKE CONTROL VALVE
29. DOUBLE CHECK VALVE
30. DUAL BRAKE VALVE
31. WEDGE BRAKE AIR CHAMBER
32. LIMITING VALVE
33. AIR COMPRESSOR/GOVERNOR
34. CHECK VALVE
35. AIR DRYER
36. DOUBLE CHECK AND STOPLAMP VALVE
37. TRAILER SUPPLY VALVE
38. TRAILER HAND CONTROL BRAKE VALVE

TA 237214 ■

2-67. AIR SYSTEM ARRANGEMENT (M917).

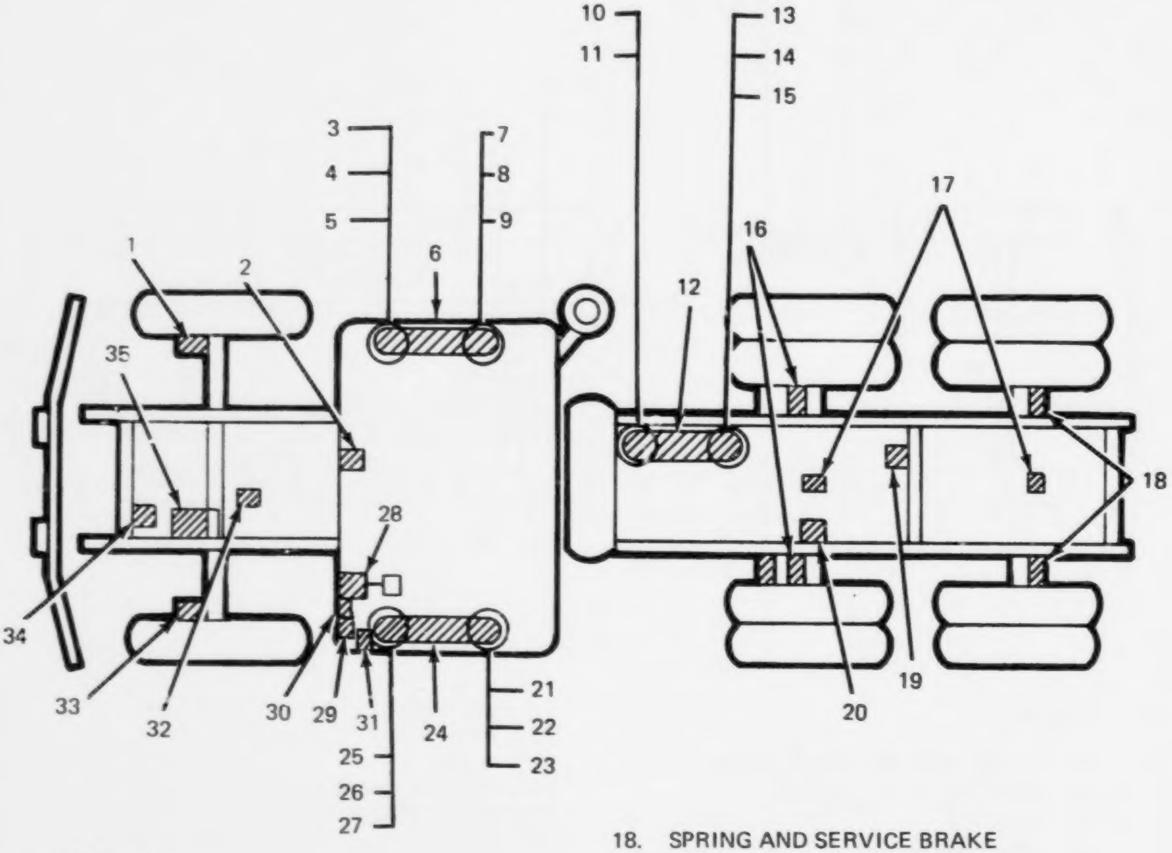


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90° CHECK VALVE
8. 90° ELBOW
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)
10. PLUG (3)
11. PRIMARY RESERVOIR
12. 45° ELBOW (2)
13. DRAIN COCK
14. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
15. RELAY VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. QUICK RELEASE VALVE (3)
18. QUICK RELEASE AND DOUBLE CHECK VALVE
19. DRAIN COCK
20. PLUG
21. 45° ELBOW
22. PRIMARY RESERVOIR
23. CHECK VALVE
24. 90° ELBOW (2)
25. EXHAUST VALVE
26. QUICK RELEASE VALVE
27. TRACTOR PROTECTION VALVE
28. DRAIN COCK
29. 90° ELBOW
30. AIR HOSE COUPLING
31. SUPPLY RESERVOIR
32. CHECK VALVE
33. ADAPTER
34. SAFETY VALVE
35. SPRING BRAKE CONTROL VALVE
36. DOUBLE CHECK VALVE
37. DUAL BRAKE VALVE
38. DOUBLE CHECK AND STOPLAMP VALVE
39. WEDGE BRAKE AIR CHAMBER
40. LIMITING VALVE
41. AIR COMPRESSOR/GOVERNOR
42. CHECK VALVE
43. TRAILER SUPPLY VALVE
44. TRAILER HAND CONTROL BRAKE VALVE
45. PRESSURE PROTECTION VALVE
46. AIR DRYER

TA 237215

2-68. AIR SYSTEM ARRANGEMENT (M918).

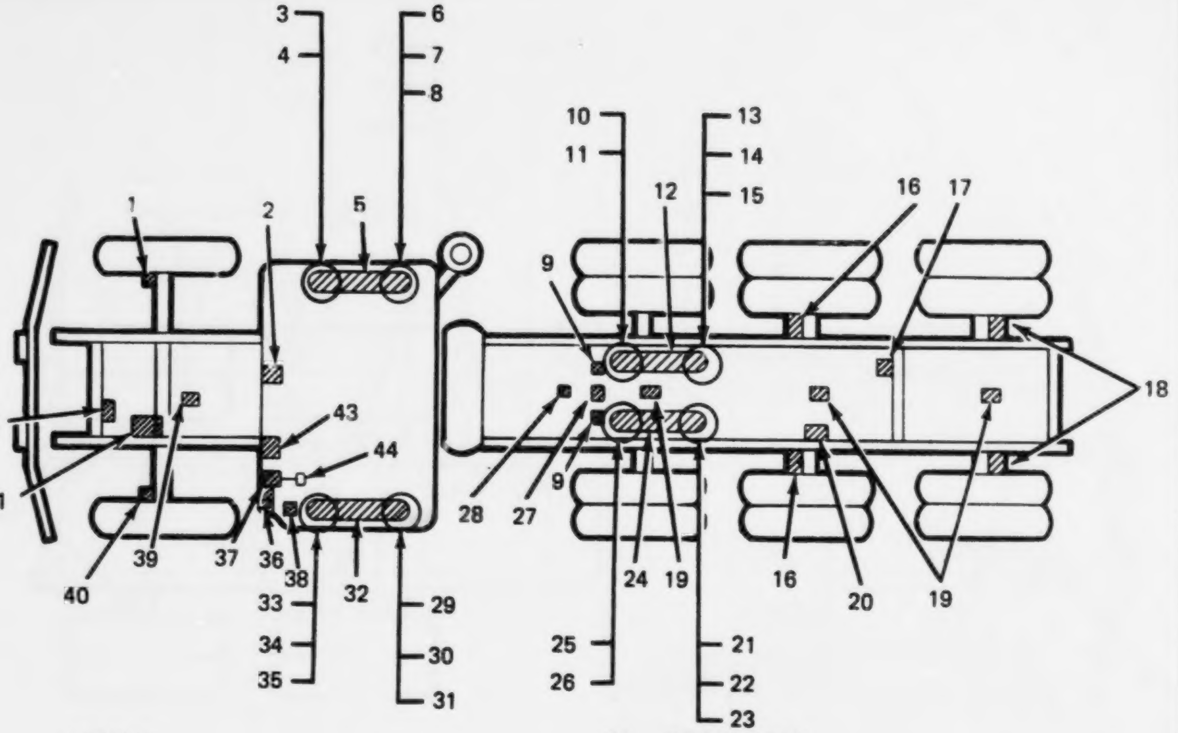


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. VALVE
4. PLUG
5. DRAIN COCK
6. SECONDARY RESERVOIR
7. DOUBLE CHECK VALVE
8. 90° CHECK VALVE
9. 90° ELBOW
10. CHECK VALVE
11. ADAPTER (2)
12. PRIMARY RESERVOIR
13. PLUG
14. 90° ELBOW
15. DRAIN COCK
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. QUICK RELEASE VALVE
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
19. RELAY VALVE
20. QUICK RELEASE AND DOUBLE CHECK VALVE
21. AIR HOSE COUPLING
22. 90° ELBOW
23. DRAIN COCK
24. SUPPLY RESERVOIR
25. CHECK VALVE
26. SAFETY VALVE
27. ADAPTER
28. DUAL BRAKE VALVE
29. SPRING BRAKE CONTROL VALVE
30. DOUBLE CHECK AND STOPLAMP VALVE
31. AIR DRYER
32. CHECK VALVE
33. WEDGE BRAKE AIR CHAMBER
34. LIMITING VALVE
35. AIR COMPRESSOR/GOVERNOR

TA 237216

2-69. AIR SYSTEM ARRANGEMENT (M919) .

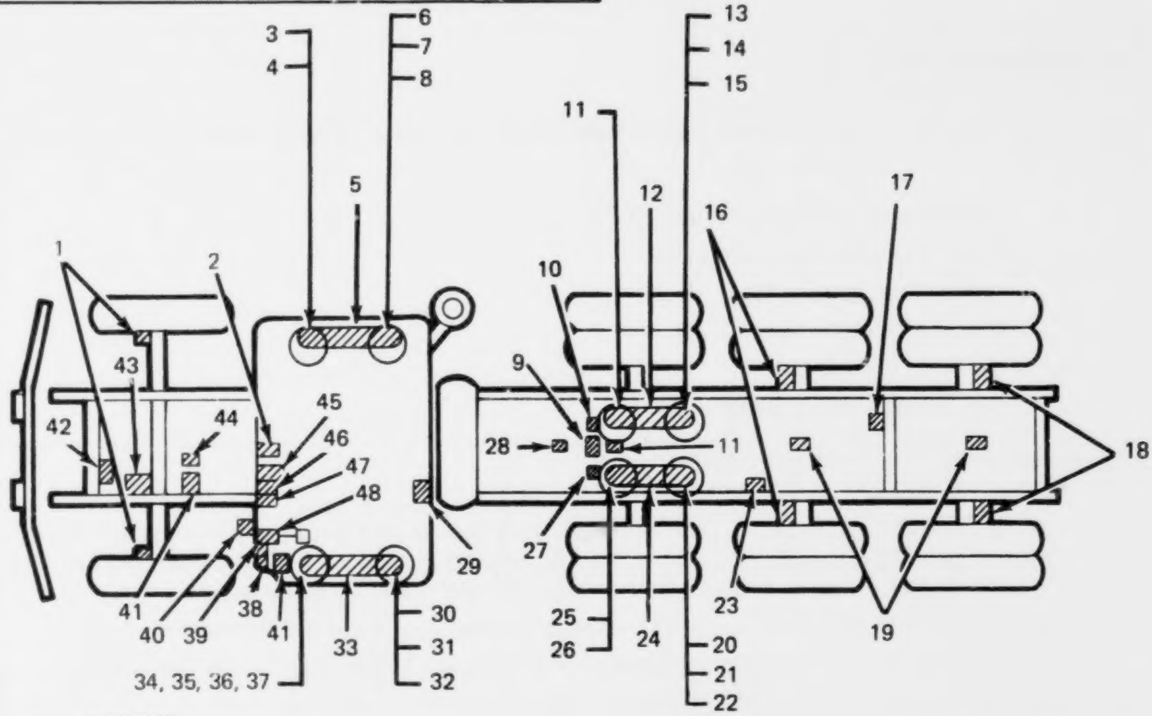


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. 90° ELBOW
7. 90° CHECK VALVE
8. DOUBLE CHECK VALVE
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)
10. PLUG (2)
11. VALVE
12. PRIMARY RESERVOIR
13. DRAIN COCK
14. 90° ELBOW
15. 45° ELBOW
16. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)
17. RELAY VALVE
18. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)
19. QUICK RELEASE VALVE (3)
20. QUICK RELEASE AND DOUBLE CHECK VALVE
21. DRAIN COCK
22. 90° ELBOW
23. PLUG
24. PRIMARY RESERVOIR
25. 90° ELBOW (2)
26. CHECK VALVE
27. QUICK RELEASE VALVE
28. EXHAUST VALVE
29. 90° ELBOW
30. AIR HOSE COUPLING
31. DRAIN COCK
32. SUPPLY RESERVOIR
33. ADAPTER
34. SAFETY VALVE
35. CHECK VALVE
36. SPRING BRAKE CONTROL VALVE
37. DOUBLE CHECK AND STOPLAMP VALVE
38. AIR DRYER
39. CHECK VALVE
40. WEDGE BRAKE AIR CHAMBER
41. AIR COMPRESSOR/GOVERNOR
42. LIMITING VALVE
43. PRESSURE PROTECTION VALVE
44. DUAL BRAKE VALVE

TA 237217

2-70. AIR SYSTEM ARRANGEMENT (M920).



LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. 90° CHECK VALVE
7. DOUBLE CHECK VALVE
8. 90° ELBOW
9. QUICK RELEASE VALVE
10. AIR BRAKE CHAMBER/SLACK ADJUSTER
11. PLUG (3)
12. PRIMARY RESERVOIR
13. 45° ELBOW
14. 90° ELBOW
15. DRAIN COCK
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. RELAY VALVE
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
19. QUICK RELEASE VALVE (3)
20. 90° ELBOW
21. PLUG
22. DRAIN COCK
23. QUICK RELEASE AND DOUBLE CHECK VALVE
24. PRIMARY RESERVOIR
25. 90° ELBOW (2)
26. CHECK VALVE
27. AIR BRAKE CHAMBER/SLACK ADJUSTER
28. EXHAUST VALVE
29. TRACTOR PROTECTION VALVE
30. DRAIN COCK
31. 90° ELBOW
32. AIR HOSE COUPLING
33. SUPPLY RESERVOIR
34. DOUBLE CHECK VALVE
35. PLUG
36. SAFETY VALVE
37. CHECK VALVE
38. SPRING BRAKE CONTROL VALVE
39. DOUBLE CHECK VALVE
40. DOUBLE CHECK AND STOPLAMP VALVE
41. AIR DRYER
42. LIMITING VALVE
43. AIR COMPRESSOR/GOVERNOR
44. CHECK VALVE
45. TRAILER SUPPLY VALVE
46. PRESSURE PROTECTION VALVE
47. HAND CONTROL TRAILER BRAKE VALVE
48. DUAL BRAKE VALVE

TA 237218

Section XXIV AUXILIARY AIR-POWERED SYSTEMS

2-71. INTRODUCTION.

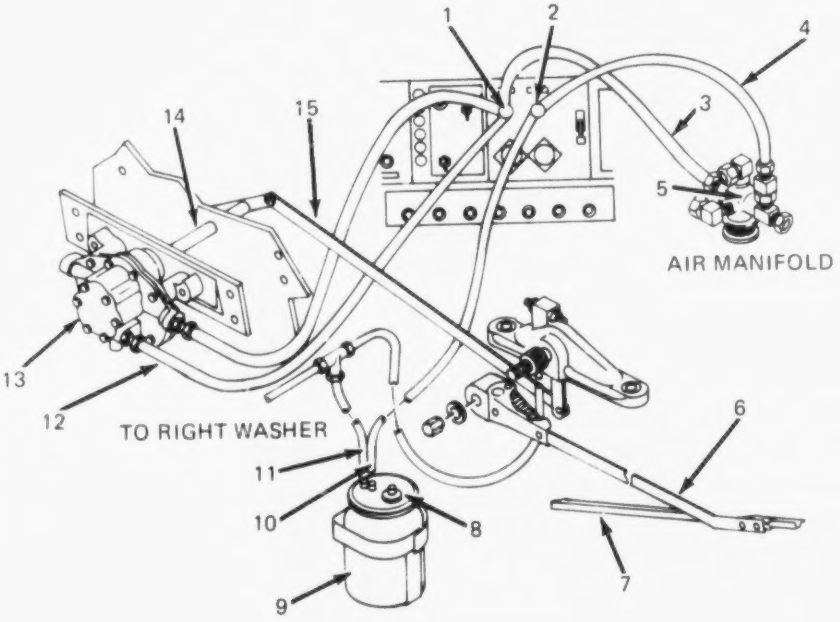
Air pressure from the compressed air system is used for the following: (Brakes are covered in section XXIII.)

a. Transmission and Controls (para 2-12).
b. Power Transfer Case (para 2-14).
c. Pusher Axle (para 2-16).
d. Windshield Wipers (para 2-72).
e. Air Horn (para 2-73).
f. Fan Clutch Control (para 2-74).

2-72. WINDSHIELD WIPERS AND WASHERS.

1. WIPER CONTROL KNOB. In OFF position, knob directs air from supply line to park line. When pulled out, it diverts air to wiper line. By turning clockwise (LOW) or counterclockwise (HIGH), desired speed is selected. Return to center and push in to park wipers.
2. WASHER BUTTON. When button is pushed, air flows from manifold to reservoir.
3. WIPER KNOB SUPPLY LINE. Carries air for wiper system from manifold to control knob.
4. WASHER AIR SUPPLY LINE. Carries air from manifold to control button.
5. COMPRESSED AIR SUPPLY MANIFOLD. Supplies compressed air to washer and wiper through supply lines.
6. WIPER ARM. Connect wiper blade to linkage blade. Moved by motor.
7. WIPER BLADE. Replaceable blade wipes windshield.
8. RESERVOIR FILLER CAP. Filter underneath cap prevents dirt from entering system. Cap closes firmly to maintain pressure in system.
9. WASHER FLUID RESERVOIR. Holds supply of washer fluid.
10. RESERVOIR AIR LINE. Carries pressurized air from button to reservoir where pressure forces fluid into washer hose.
11. WASHER FLUID HOSE. Carries washer fluid from reservoir onto windshield
12. PARK AIR LINE. When knob is pushed into PARK position, air flows through park line to motor causing wiper blades to move down to REST position.
13. WIPER MOTOR. Air-powered motor turns wipers back and forth when air comes from wiper line or moves them down windshield to PARK position when air comes through park line.
14. WIPER AIR LINE. When knob is in WIPE position, air flows through wiper line to motor which starts wiper blades in motion.
15. WIPER LINKAGE. Linkage from motor actuates two wiper arms.

2-72. WINDSHIELD WIPERS AND WASHERS (Continued).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AIR MANIFOLD
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TO RIGHT WASHER
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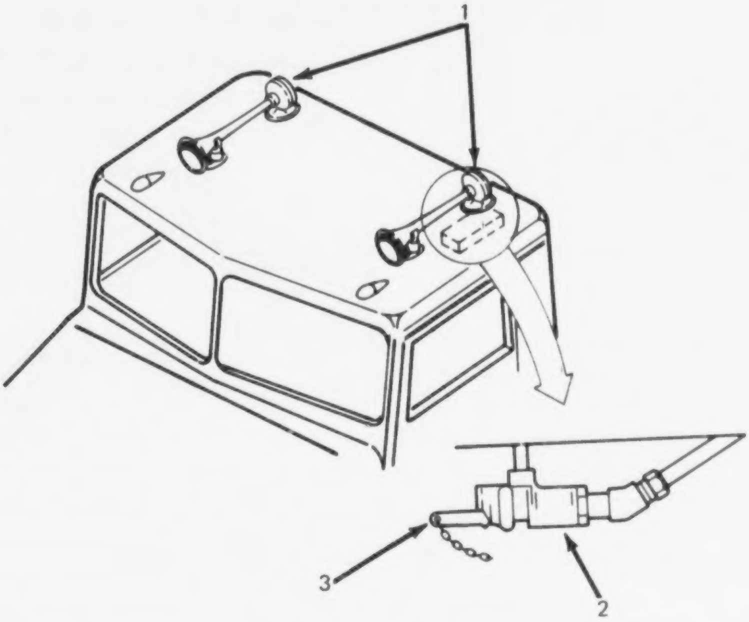
TA 074601

2-73. AIR HORNS .

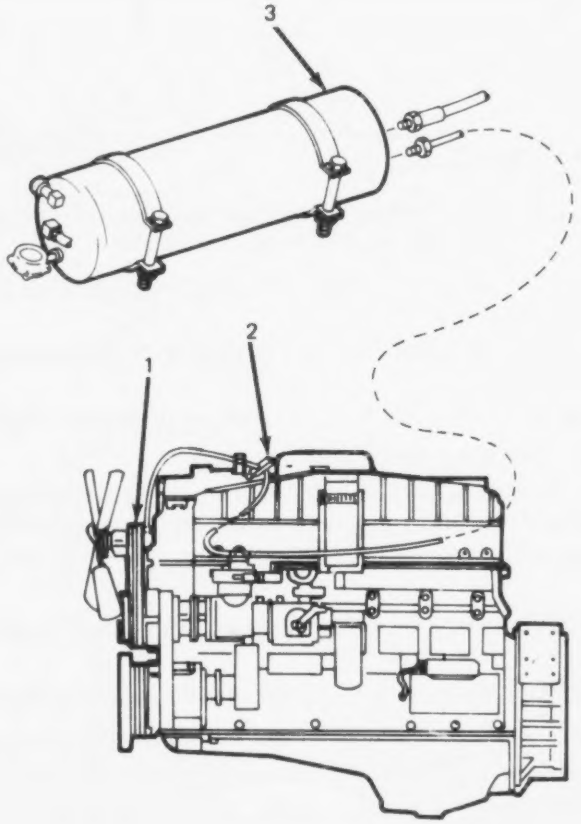
1. AIR HORNS. Air-powered signaling devices.
2. CONTROL VALVE. Allows compressed air to flow to horns when lever is pulled downward.
3. LEVER. Actuates control valve when pulled downward by chain in cab.



TA 074602

2-74. FAN CLUTCH CONTROLS.

1. **FAN CLUTCH.** When actuator opens, compressed air from supply reservoir engages clutch to actuate fan.
2. **FAN CLUTCH ACTUATOR.** Opens air connection between supply reservoir and fan clutch when coolant temperature rises above 190°F (88°C).
3. **PRIMARY RESERVOIR.** Supplies air pressure to engage clutch and rotate fan when actuator opens air connection.



TA 074603

Section XXV STEERING SYSTEM

2-75. INTRODUCTION.

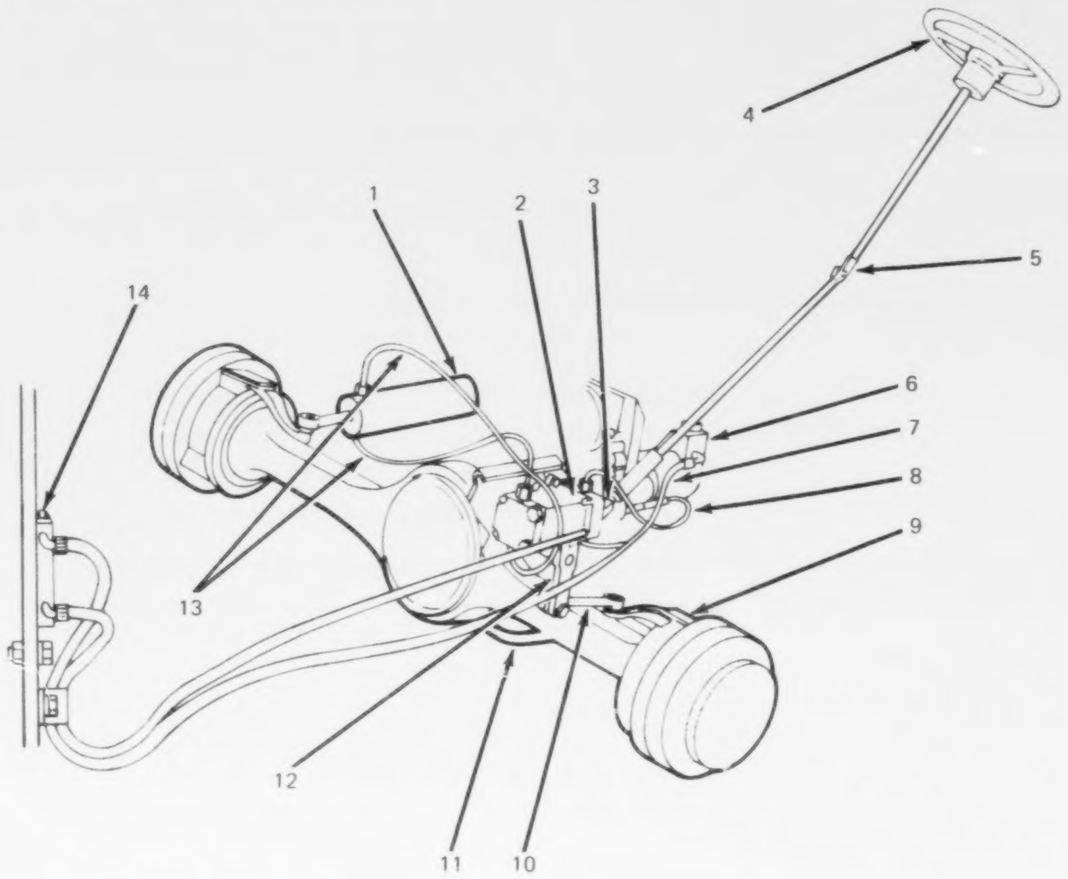
Two power steering systems are used for the M915 thru M920 vehicles: one for the M915 and one for the M916 thru M920. The systems are identical, except for the following:

> Auxiliary power cylinder and associated hydraulic lines - used on the M916 thru M920 only.

2-76. STEERING SYSTEM.

1. AUXILIARY ASSIST CYLINDER. Piston moved back and forth by pressure from lines. Connects to right wheel steering arm through auxiliary drag link. (M916 thru M920 ONLY.)
2. POWER STEERING GEAR. Hydraulically multiplies input torque from steering column and transmits it to Pitman arm.
3. UNIVERSAL. Changes angle of torque from steering wheel and applies it to input shaft of power steering gear.
4. STEERING WHEEL. Provides rotational torque to steering shaft, actuating steering system.
5. UNIVERSAL. Changes angle of steering torque.
6. HYDRAULIC PUMP AND RESERVOIR. Pump supplies hydraulic pressure to power steering system. Reservoir provides a supply of oil to assure complete filling of hydraulic system.
7. STEERING GEAR RETURN LINE. Carries hydraulic fluid from steering gear back to reservoir.
8. STEERING GEAR SUPPLY LINE. Carries hydraulic fluid under pressure from pump to steering gear.
9. STEERING ARM. Transmits fore and aft movement from drag link to knuckle assembly.
10. DRAG LINK. Transfers motion of Pitman arm to steering arm and tie rod.
11. TIE ROD ASSEMBLY. Connects steering arms so that wheels turn together.
12. PITMAN ARM. Transfers steering torque (boosted by power steering gear to drag link).
13. AUXILIARY CYLINDER HYDRAULIC LINES. Carry fluid under pressure from the steering gear to operate auxiliary cylinder.
14. POWER STEERING COOLER. Cools power steering fluid by means of finned unit on vehicle grille, exposed to outside air. After the fluid is cooled, it is returned to the power steering system.

2-76. STEERING SYSTEM (Continued).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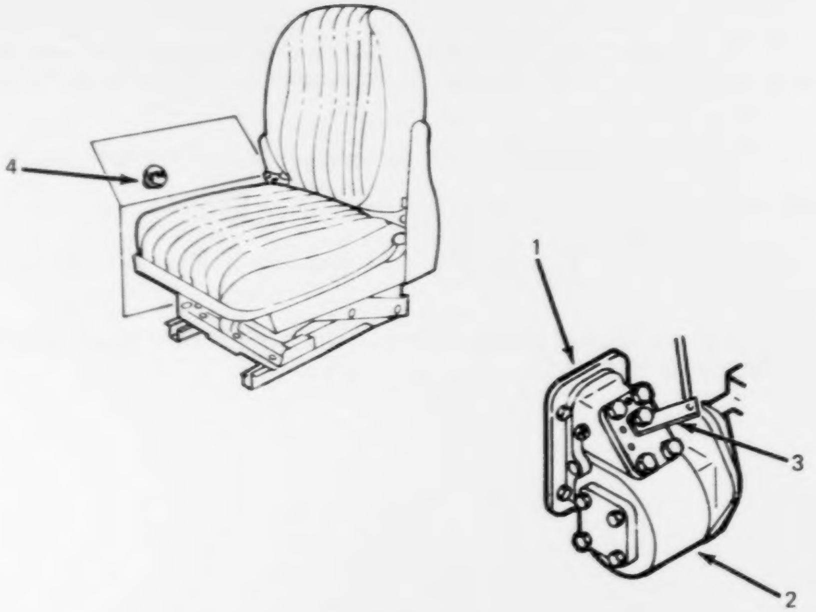
Section XXVI POWER TAKEOFF

2-77. INTRODUCTION.

The power takeoff is installed on M916 thru M920. It supplies power from the engine to auxiliary equipment.

2-78. POWER TAKEOFF.

1. PTO ADAPTER. Mounts on transmission and mates to transmission drive gear.
2. PTO. Gear driven from adapter. Provides drive for:
   - *a.* Winch hydraulic pump on the M916 and M920 (para 2-80).
   - *b.* Hoist cylinder hydraulic pump on the M917 (TM 5-3805-274-24 & P).
   - *c.* Hydraulic power pump on the M918 (TM 5-3895-371-24 & P).
   - *d.* Power train jack screw for conveyor drive on the M919 (TM 5-3895-372-20).
3. CONTROL LEVER. Engages or disengages PTO. Actuated by pulling control knob in cab.
4. PTO CONTROL KNOB. Allows movement of control lever from cab. Pulling knob out engages PTO. Pushing knob in disengages PTO.



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Section XXVII WINCH

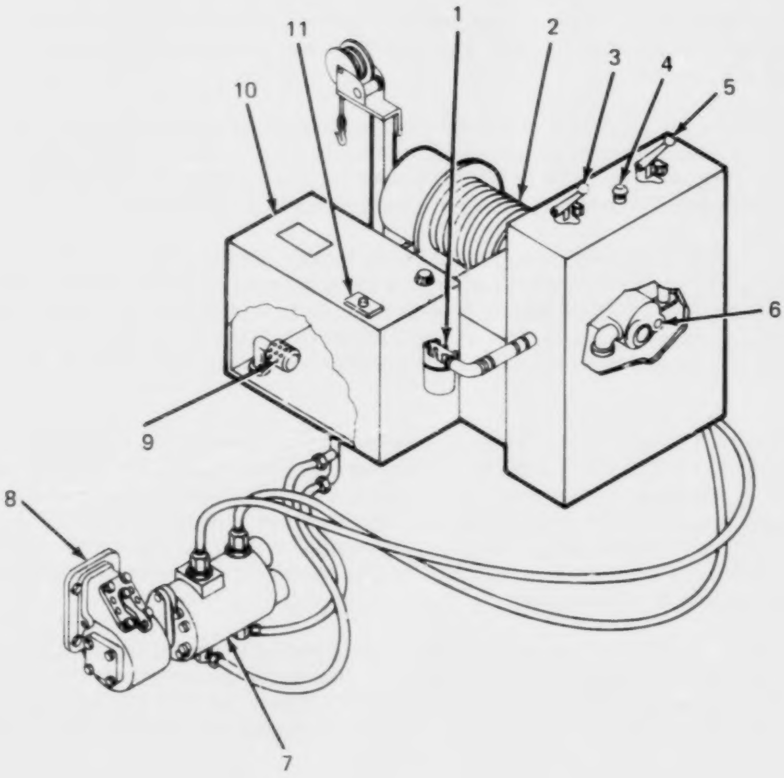
2-79. INTRODUCTION.

The winch is installed on M916 and M920. The assembly is located behind the cab with all operating controls.

2-80. WINCH.

1. INLINE RETURN FILTER. Throwaway filter removes water and dirt from oil returning to reservoir.
2. WINCH CABLE. 7/8 inch (22.2 mm) diameter wire rope, 150 feet (46 m) long. Rated at 75,000 lbs (33,600 N) minimum breaking strength.
3. CONTROL VALVE. Detented "up" position supplies pressure to outlet for auxiliary hydraulic system. Down position provides high speed winch operation.
4. AUXILIARY THROTTLE. Adjusts power input to PTO by altering engine speed.
5. DIRECTIONAL CONTROL VALVE. Controls winch direction. Spring-loaded valve returns to middle position when released, causing winch brakes to apply.
6. HYDRAULIC MOTOR. Turns winch to pay out or haul in cable. Powered by oil under pressure from pump.
7. DUAL PUMP. 22 gpm/gear; total of 44 gpm @ 2200 engine rpm gear type pump powered by PTO supplies 2350 psi (14,800 kPa) hydraulic pressure to motor through hydraulic valves.
8. POWER TAKEOFF. Drives dual pump. (See paragraph 2-78 for functional description.)
9. INLET STRAINER. Removes large particles from oil going to dual pump.
10. HYDRAULIC RESERVOIR. Supplies oil to dual pump and receives oil returning from system.
11. COVER PLATE. When removed allows access to interior of reservoir to service interal strainer and for general clean out.

2-80. WINCH (Continued).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Section XXVIII WINTERIZATION KIT

2-81. INTRODUCTION.

The Winterization Kit is an available option on all M915 thru M920 vehicles. This kit facilitates vehicle start-up at temperatures down to -50°F (-46°C.). The components of this kit are described below.

2-82. WINTERIZATION KIT.

1. 110 VAC POWER CORD. This twenty-five foot power cord is used to connect a suitable 110/115 V exterior power supply to the power receptacle mounted on top of the vehicle circuit breaker box.

2. CIRCUIT BREAKER BOX. Mounted to the vehicle right side behind the front fender and in front of the battery box, this control center channels incoming 110 VAC electrical power to any of four separate heaters. Each of the heaters is controlled and protected by an individual circuit breaker.

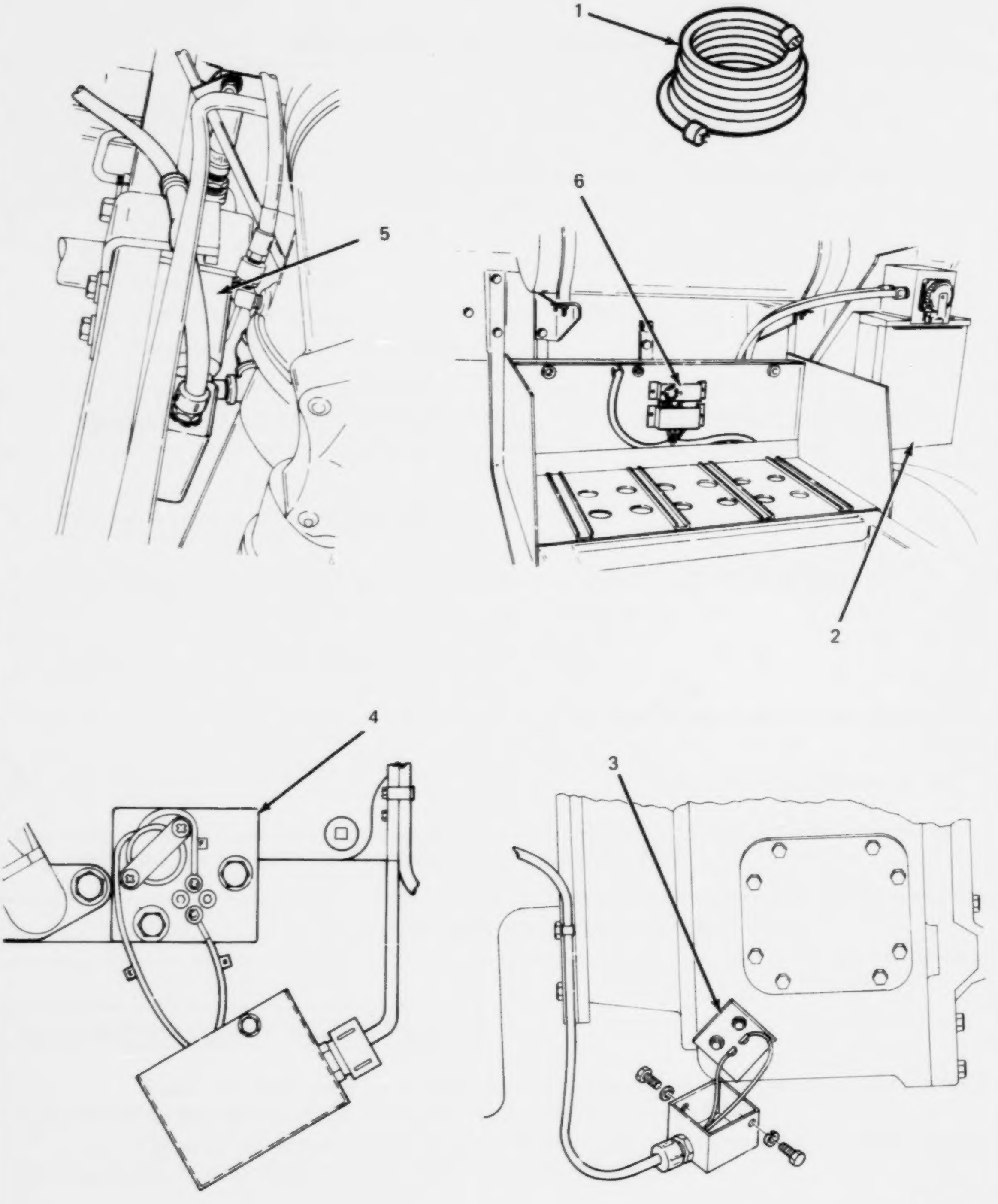
3. TRANSMISSION OIL HEATER. Located on the forward, lower, left side of the transmission, this immersion heater supplies 375 watts. No thermostat is used due to the relatively low wattage. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.

4. ENGINE OIL HEATER. Also an immersion type heater, the unit is mounted thru the aft, lower, left side of the engine oil pan with a capacity of 750 watts, which is controlled by a thermostat set at 170°F. The thermostat mounts to a plate outside the oil pan and is protected by an insulated waterproof cover. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.

5. ENGINE COOLANT HEATER. This thermo-syplon type requires no circulating pump and has a capacity of 2700 to 2800 watts. The heating unit integral with a thermostat set at 190°F, is mounted to the main right hand frame rail below the turbocharger. The heated coolant is piped to the top of the engine into the rear water manifold. The hot coolant flows down thru the engine as the cold coolant returns to the heater. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 30 ampere.

6. BATTERY BOX HEATER. The battery box is insulated and heated by a coil, under the battery support, with a capacity of 550 watts. A thermostat mounted on the inside back wall of the box closes at +35°F and opens at +55°F. When the 110 VAC power cord is plugged in, this heater can be operated by the circuit breaker so marked. The breaker is a 15 ampere.

2-82. WINTERIZATION KIT (Continued).



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CHAPTER 3

INTEGRATED SYSTEMS MAINTENANCE

3-1. OVERVIEW.

This chapter provides you with the following information related to overall truck tractor/truck chassis maintenance:

a. Tools and Equipment.
b. Service Upon Receipt.
c. Preventive Maintenance Checks and Services (PMCS).
d. Composite Troubleshooting Index.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

3-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

There are no special tools, TMDE and support equipment required for the procedures in this chapter.

3-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II SERVICE UPON RECEIPT

3-5. CHECKING UNPACKED EQUIPMENT.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF Form 364, Report of Discrepancy (ROD).

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

3-6. SERVICE UPON RECEIPT CHECKLIST -- M915 THRU M920 VEHICLES.

LOCATION/ITEM	ACTION	REMARKS
1. Protective wrappings.	Remove.	
2. Engine, tires, glass panels, instruments.	Check for missing parts or shipping damage.	
3. Separately packaged kits.	Inspect for damage.	
4. Brakes and brake shoes.	Check to be sure brake shoes do not stick to brake drums.	See para 2-64 thru 2-70 for locations.
5. Breather tube, air intake, exhaust stack, transmission, alternator, brakes.	Remove all tape and wrapping.	See paras 2-12, 2-25, 2-27, 2-30, 2-42, and 2-64 thru 2-70 for locations.
6. Water pump and alternator belts.	Check tension and adjust if necessary.	See para 4-51 and 4-53.
7. Cooling system, fuel system, transmission, and differentials.	Check fluid levels.	TM 9-2320-273-10.

CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners cause leather, rubber, and synthetic materials to dry out, rot, and lose pliability

LOCATION/ITEM	ACTION	REMARKS
8. Machined surfaces	Remove wrappings. Clean with SD-2 dry cleaning solvent.	
9. a. Key switch, engine retarder switch, worklamps, clearance lamps, headlamp switch, cigar lighter.	Make sure all electrical switches are OFF.	See TM 9-2320-273-10 for locations.
b. Battery cables.	Connect.	See para 5-37.
10. Oil system.	If truck is due for an oil change, drain crankcase, replace filters, and refill to operating level.	See para 4-14.
11. Entire vehicle.	a. Lubricate.	See LO 9-2320-273-12.
	b. Inspect for: 1. Leaks. 2. Loose or broken hoses and lines. 3. Other damage.	

Section III PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-7. INTRODUCTION.

Inspect the truck systematically so that you can discover and correct defects before they result in serious damage or failure. The necessary preventive maintenance checks and services (PMCS) to be performed are listed in table 3-1. The Item Number column may be used as a source of item numbers for the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

CAUTION

After the initial 500 miles of operation, check tightness of all bolts and capscrews that pass through the vehicle frame, to the specified torque found in section V. Pay particular attention to the suspension mounting bolts.

Table 3-1. Organizational Preventive Maintenance Checks and Services.

Legend

B – Biennial **S - Semiannually**
A - Annually

Item No.	Interval			Item to be Inspected	Procedures
	B	S	A		
					ENGINE COMPARTMENT
1		*		Air Intake System	Check to see that the air cleaner and hose are secure. Inspect the hose for damage. Check the air cleaner element for contamination, and clean or replace, as necessary.
2		*		Engine Lubrication, Oil Cooler, & Oil Lines	Check oil filters, oil cooler, and oil lines for leakage and damage. Inspect all oil line fittings for tightness.
3		*		Lubrication	Lubricate in accordance with the intervals in LO 9-2320-273-12.
4		*		Alternator and Wiring	Check for loose wiring connections or worn insulation. Be sure the alternator mounting is secure.
5		*		Fan, Alternator, and Water Pump	Inspect the pulleys for alinement. Check the belt for proper tension (1/2 to 3/4 inch (1.2 to 1.9 cm) deflection when you press down firmly). Inspect the water pump for leaks. Inspect fan shrouds to see that they are securely mounted and do not touch fan as it turns.
6		*		Cooling System	Inspect radiator core, hoses, cap, and gaskets. Check core for clogging or bent fins. Note coolant level. If required, drain the radiator and cylinder block. Flush and refill the cooling system with MIL-A-46153. See maintenance section for coolant filter corrosion kit (refer to TM 9-2320-273-34&P).
7		*		Steering	Check oil level in the power steering oil reservoir. Inspect the oil pump and lines for damage and leaks. Check for proper adjustment of the steering stops. Check the steering gear mounting capscrews (refer to para 10-18).
8		*		Fuel System	Inspect the engine compartment and underside of the vehicle for leaks. Check lines and connections for damage and replace, if necessary.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial

S – Semiannually

A – Annually

Item No.	**Interval**			**Item to be Inspected**	**Procedures**
	B	**S**	**A**		
9		*		Engine Mount	Inspect for cracks or looseness.
					WHEELS AND UNDERBODY
					CORROSION INSPECTION **NOTE** Using the inspection light, inspect the entire vehicle, paying particular attention to the areas where dirt and/or moisture collect. Any seam beginning to split and/or expand must be repaired, as well as metal surfaces that have begun to pit and/or flake.
10		*		Vents and Plugs	Remark any vents and/or plugs that will enable you to see the interior of the sheet metal, where serious rust develops.
		*		Hood and Fenders	Begin at the front of the vehicle, check the perimeter of the hood (after opening) then proceed to the top scams of the fenders and eyebrows. Look through opens in fenders (where possible) to check as much of the front fender and wheelhouse scam as possible.
		*		Frame	Look down frame and check for flaking.
		*		Battery Box, Radiator Supports and Headlight	Check the battery box, radiator supports and headlight hardware for any signs of flaking.
		*		Side Panels	Inspect both sides of vehicle, check for bubbling and/or discolored paint. If you find any rusted area on the outside of the vehicle, determine whether it is surface rust (due to a paint nick or poor paint application) or if it is working its way out from the inside.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial

S – Semiannually

A – Annually

Item No.	**Interval**			**Item to be Inspected**	**Procedures**
	B	**S**	**A**		
					WHEELS AND UNDERBODY (CONTINUED)
					NOTE If a seam has begun to discolor, it must be repaired along with other rust damage.
		*		Doors	Check all seams on doors, doorjams and doglegs. Look for chipped and/or bubbling paint discoloration of the painted and splitting scams. If you cannot find good metal under the bubbling paint, the rust has worked its way through the metal and must be repaired.
					CORROSION INSPECTION
					NOTE On some vehicles, it will be necessary to remove the taillights or loosen an interior panel to properly inspect the quarter panel.
		*		Quarter Panel-Floor Taillights	Inspect quarter panel around wheelhouse scam, floor extensions and the scams around taillights.
				Wheelhousing	Looking through the wheelwell openings and check the condition of the underside (wheelhousing, floor pan, frame, etc.)
					NOTE If you can not properly inspect the underside in this manner, put the vehicle up on a hoist and check.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial
S - Semiannually
A - Annually

Item No.	Interval			Item to be Inspected	Procedures
	B	S	A		
11		*		Tires	CAUTION Do not mix radial and bias ply tires on the same vehicle. Make sure tires are cold when you check pressure. Inspect tires for unusual wear, penetrating objects, and improper matching. If required, rotate and match tires according to tread design and degree of wear. Refer to TM 9-2610-200-20. Inflate or deflate to proper pressure (100 psi (689 kPa) front, 90 psi (620 kPa) rear). (Reference TM 9-2320-273-10.)
12		*		Wheel Alinement	Check toe-in and adjust as necessary. Toe-in should be 1/8 inch (3.2 mm).
13		*		Parking Brake	Inspect spring brake control valve, lines, and double air brake chambers for leaks and damaged fittings.
14		*		Air Brake System	Inspect air reservoir, air lines, and fittings for damage and leaks. Open reservoir drain cocks and drain accumulated water. Inspect the air compressor and air line for damage and security. Inspect all air valves, air chambers, and connecting lines for leaks and damaged fittings. Inspect the trailer brake hose and couplings for damage and leaks. Inspect the slack adjuster and cams for proper adjustment.
			*	Air Dryer	Inspect connecting lines and fittings for leaks and damage. Replace air dryer dehydrate cartridge.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial

S - Semiannually

A - Annually

Item No.	Interval			Item to be Inspected	Procedures
	B	S	A		
15		*		Suspension	Inspect the seals for damage. If damaged, inspect the wheel bearing grease for contamination. Inspect for worn rubber bushings and insulators. Make certain suspension arms are not damaged. Inspect for damaged springs. Check for leaks.
16		*		Propeller Shafts and U-Joints	Inspect for loose bearings, damaged seals, and damaged lubricant fittings. Inspect for loose bolts and tighten, if required.
					TRUCK EXTERIOR
17		*		Body, Frame & Accessories	Make general inspection of body, including glass, doors, panels, top, fenders, and brackets. Check tightness of all bolts and capscrews that pass through the frame to torque specified in section V. Examine the condition of paint and markings. Check the warning, caution, and identification nameplates for legibility. Check for rust and corrosion damage.
18		*		Winch (M916 & M920, only)	Check for damage and proper operation of winch assembly. Check gear case oil level. Check for proper braking. Inspect winch cables for damage, kinks, frayed strands, and excessive wear. Check for proper lubrication.
19		*		Winch Control Panel	Check the control panel cylinders and hoses. Look for hydraulic leaks. Check the hydraulic fluid reservoir and add fluid, if necessary.
20		*		5th Wheel Assemblies	Inspect and test the operation of the locking mechanism. Adjust as necessary (refer to para 11-13).
21		*		Towing Pintle (M915, M916, M917 and M920)	Check operation of pintle hook. Check the mounting bolts for tightness.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial **S - Semiannually**

A - Annually

Item No.	**Interval**			**Item to be Inspected**	**Procedures**
	B	**S**	**A**		
					CAUTION Do not charge, test, or jumpstart battery if test indicator is yellow!
22		*		Batteries	Inspect the cables and clamps for tightness and condition. If test indicator is green or dark, test battery.
23		*		Lamps & Reflectors	Check operation of the lamps and lamp switches. Check for damaged reflectors.
24		*		Safety Devices	Check fire extinguisher case to see that it is properly charged. Inspect hydraulic jack for sufficient fluid.
					CAB
25		*		Cab Safety Devices	Press the electric horn button and pull air horn chain to sound the horns and determine if the signals are normal (if situation permits). Test the windshield wipers for satisfactory operation. Examine the rear view mirror. Examine the doors for tight seal and ease of operation. Check the seatbelts; if worn or frayed, replace. Try on the seatbelt and test the buckle to make sure it doesn't open with light pressure. The seatbelt must be firmly anchored. Check operation of the windshield washer. Nozzles should be adjusted so that the spray is within the wipe pattern area.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial
S - Semiannually
A - Annually

Item No.	Interval B	Interval S	Interval A	Item to be Inspected	Procedures
					ROAD TEST
26		*		Instrument Panel	Check warning lamps. Check the fuel gage, voltmeter, air pressure gages, tachograph, oil pressure gage, and temperature gages for normal readings (refer to TM 9-2320-273-10): a. fuel gage - reading depends on fuel level. b. voltmeter - 12 - 15 volts. c. air pressure gages - 90 - 120 psi when engine is warmed up. d. tachograph - 580 - 620 rpm idle speed. e. engine oil pressure gage - 5 - 20 psi at idle speed. f. transmission oil temperature gage - 190° - 265° when engine is warmed up. g. engine water temperature gage - 165° - 195° F when engine is warmed up.
27		*		Starter & Switch	Listen to starter for any unusual noise. Notice if the starting motor engages smoothly and turns the engine at normal cranking speed.
28		*		Engine Performance	In starting and warming the engine, observe if it starts easily and if the action of the throttle is satisfactory. Notice if idling speed is 580-620 rpm. Listen for any unusual noises at idle and at higher speeds. When operating the vehicle, notice if it has normal power and acceleration in each speed range. Listen for any unusual noises when the engine is loaded down. After the preliminary warmup period, accelerate the engine to maximum governed speed (2200 rpm) and check engine response to acceleration.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial **S - Semiannually**

A - Annually

Item No.	**Interval**			**Item to be Inspected**	**Procedures**
	B	**S**	**A**		
29		*		Transmission	Note operation through all drive selections. Listen for unusual noises and inspect for signs of malfunction or lubricant leakage. Check transmission to bellhousing bolts for gaps and torques. If any bolt shows a gap or is loose, remove bolt and apply loctite, reinstall bolt with flat washer and torque to 55 lb-ft ±5 lb-ft (74.6 N.m ±6.8 N.m); then proceed to check all the remaining bolts as follows: Torque each bolt to 50 lb-ft (67.8 N.m). If bolt does not move or has no gap further action is not necessary. If bolt turns or has a gap, remove and apply loctite, reinstall bolt, flat washer and torque to 55 lb-ft ±5 lb-ft (74.6 N.m ±6.8 N.m). Taking oil sample for AOAP (refer to para 6-9).
30		*		Steering	Check for binding in the steering control system. Check steering operation on road.
31		*		Air Brake System	Check the operation of the compressor. Compressor should control air pressure at 105-125 psi (723-861 kPa). Be alert for unusual noises. Check operation of the warning system and governor under load. Check brake operation.
32		*		Air Brake Hoses	Check all brake hoses. Where the hose is close to the frame, check for wear, pinching, or interference. If any of these are found, the hose must be carefully inspected for serviceability and replaced or repositioned to prevent failure. When inspection reveals the hose is chafed, cracked, crimped or abraded which has damaged outer casing through the first ply of fabric, hose replacement is mandatory before vehicle use. Any evidence of leakage or bulges deems hose replacement mandatory.

Table 3-1. Organizational Preventive Maintenance Checks and Services (Continued).

Legend

B – Biennial **S - Semiannually**
A - Annually

Item No.	**Interval**			**Item to be Inspected**	**Procedures**
	B	**S**	**A**		
					WARNING EXHAUST PIPE AND MUFFLER During normal operation the exhaust pipe and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the pipe or muffler. Exhaust system components may be hot enough to cause serious burns.
33		*		Exhaust System	Listen for loud or unusual noises and look for exhaust leaks. Tighten exhaust manifold mountings and/or clamps if you observe leakage. Inspect the muffler and exhaust pipe for damage.
34		*		Power Takeoff (M916 thru M920)	Check for proper operation of power takeoff.
35		*		Final Road Test	Perform the final road test. Pay special attention to items which have been repaired or adjusted. Correct any defects or malfunctions which occur during the road test.
36		*		Winterization Kit (Optional)	Plug in 110 VAC power cord to power source and to receptacle on vehicle circuit breaker box with vehicle exposed to +35°F (+1.6°C) or lower. Flip all four circuit breakers ON. Allow at least 15 minutes, then check for appropriate heating level. a. Engine coolant to +190° F. b. Engine oil to +170° F. c. Transmission oil to +55° F. d. Battery box to +55° F. If proper heating does not occur, check wiring for breaks, check circuit breakers, check thermostats (none for transmission), and heaters. Never operate a heater without fluid in the oil pan, transmission, or engine cooling system.

Section IV TROUBLESHOOTING SYMPTOM INDEX

3-8. INTRODUCTION.

Detailed troubleshooting procedures are provided in chapters 4 thru 12 of this manual. The procedures are arranged by subsystem categories under Malfunction Symptoms. The following composite Malfunction Symptom Index provides a cross reference to the troubleshooting procedures contained in the other chapters.

Table 3-2. Composite Troubleshooting Symptom Index

	Troubleshooting Procedures	
	Table	Malfunction Number
BACKUP LAMPS.		
Backup lamp(s) inoperative.	5-12	1
BATTERY SYSTEM.		
All electrical systems are weak.	5-1	1
Engine fails to crank or cranks slowly.	5-1	2
Batteries do not hold a charge.	5-1	3
BLACKOUT LIGHTING SYSTEM.		
All blackout lamps inoperative.	5-13	1
One blackout marker, headlamp, tail lamp, or stop lamp inoperative.	5-13	2
Trailer blackout lamps inoperative.	5-13	3
CHARGING CIRCUIT.		
Batteries are being undercharged or overcharged.	5-5	1
COMPRESSED AIR AND BRAKE SYSTEMS.		
Insufficient air pressure.	9-1	1
Excessive system pressure indicated.	9-1	2
Park brakes will not release.	9-1	3
Trailer brakes will not release.	9-1	4
Service brakes will not release (one wheel only).	9-1	5
Service brakes will not apply.	9-1	6

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
COMPRESSED AIR AND BRAKE SYSTEMS (Continued).		
No service brakes on trailer only.	9-1	7
Trailer hand control unit will not apply trailer service brakes.	9-1	8
Park brakes will not apply.	9-1	9
Service brakes are weak or slow responding (all wheels).	9-1	10
Front service brakes are weak or slow responding.	9-1	11
Rear service brakes are uneven or erratic.	9-1	12
Service brakes are uneven or erratic on one or more wheels.	9-1	13
Brakes overheat.	9-1	14
Stop lamps do not operate, brakes function normally.	9-1	15
Pressure gage(s) not indicating or not accurate, brakes normal.	9-1	16
Air horn does not operate.	9-1	17
Windshield wipers are inoperative.	9-1	18
Interaxle differential lockup inoperative.	9-1	19
ENGINE.		
Engine will not crank.	4-1	1
Engine will crank but not start.	4-1	2
Engine stops, not seized.	4-1	3
Engine stops, seized.	4-1	4
High oil consumption.	4-1	5
Intermittent loss of power.	4-1	6
Sudden loss of power.	4-1	7
Gradual loss of power, no smoke.	4-1	8
Slow deceleration, engine "floats".	4-1	9

Table 3-2. Composite Troubleshooting Sympton Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
ENGINE (Continued).		
Erratic idle speed.	4-1	10
Excessive exhaust smoke during acceleration.	4-1	11
Excessive exhaust smoke throughout speed range.	4-1	12
High fuel consumption.	4-1	13
Low oil pressure.	4-1	14
No cab heat.	4-1	15
Excessive exhaust noise.	4-1	16
Exhaust fumes in cab.	4-1	17
Engine overheats	4-1	18
ENGINE RETARDER CONTROLS.		
No retarding action.	5-4	1
Retard inoperative in one or two selector position.	5-4	2
ETHER QUICK-START CONTROLS.		
Solenoid cannot be heard to click when ether button is pushed.	5-3	1
FRAME.		
Towing pintle does not pivot or latch, or jaw is stuck.	11-1	1
Excessive jerking of towed trailer.	11-1	2
Excessive noise or popping sounds from fifth wheel when turning.	11-1	3
HEADLAMPS.		
Both headlamps blink on and off.	5-8	1
One headlamp inoperative.	5-8	2
Both headlamps inoperative.	5-8	3
High beam indicator inoperative.	5-8	4

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
INSTRUMENTS AND INDICATORS.		
Differential lockup lamp inoperative.	5-7	1
Park brake lamp inoperative.	5-7	2
Instrument panel gages inoperative.	5-7	3
Tachograph clock is inoperative.	5-7	4
Indicator/illumination lamp out.	5-7	5
MARKER LAMPS.		
Front marker lamps inoperative.	5-9	1
Intermediate marker lamps inoperative.	5-9	2
Rear marker lamps inoperative.	5-9	3
All marker lamps inoperative.	5-9	4
MISCELLANEOUS ELECTRICAL.		
Electric horn inoperative.	5-14	1
Personnel heater fan inoperative.	5-14	2
Dome lamp inoperative.	5-14	3
Work lamps inoperative.	5-14	4 & 5
Cigar lighter inoperative.	5-14	6
Winterization kit malfunctioning.	5-14	7
PARKING AND TAIL LAMPS.		
Single lamp inoperative.	5-10	1
Front lamps inoperative.	5-10	2
Rear lamps inoperative.	5-10	3
POWER TAKEOFF.		
PTO will not engage.	12-2	1
PTO is excessively noisy.	12-2	2
POWER TRANSFER CASE.		
Power transfer case does not turn front axle propeller shaft.	7-1	1
Excessive heat buildup.	7-1	2

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
POWER TRANSFER CASE (Continued).		
Lubricant leaking.	7-1	3
Transfer case noisy (oil level okay).	7-1	4
PROPELLER SHAFTS AND AXLES.		
Excessive shaft noise or vibration.	8-1	1
Excessive backlash.	8-2	1
Continuous axle or wheel noise.	8-2	2
Lubricant leaking.	8-2	3
Excessive or uneven tire wear.	8-2	4
STARTER SYSTEM.		
Starter fails to crank or cranks too slowly.	5-2	1
Starting motor is noisy and engagement is erratic	5-2	2
STEERING.		
Front tires wearing unevenly.	10-2	1
Hard steering.	10-2	2
Vehicle wanders or pulls to one side.	10-2	3
Lost motion or excessive play in steering wheel.	10-2	4
Temporary increase in effort when turning steering wheel.	10-2	5
Vehicle does not fully steer from stop to stop.	10-2	6
STOP AND TURN SIGNAL LAMPS.		
Turn signals inoperative.	5-11	1
Stop lamps inoperative.	5-11	2
SUSPENSION.		
Vehicle wanders or shimmies.	10-3	1
Pusher axle will not raise or lower.	10-3	2
Rear axle assembly not tracking properly.	10-3	3

Table 3-2. Composite Troubleshooting Symptom Index (Continued).

	Troubleshooting Procedures	
	Table	Malfunction Number
TRANSMISSION.		
Selector lever cannot be moved from NEUTRAL position.	6-1	1
Engine does not turn driveshaft in any speed, forward or reverse.	6-1	2
Engine turns driveshaft in some gears, but not others.	6-1	3
Engine does not turn power takeoff in NEUTRAL.	6-1	4
Truck moves when engine is at low idle and transmission in gear.	6-1	5
Transmission housing breather shows an air leak after the shift is complete.	6-1	6
Transmission feels like it is engaged, then not engaged, then engaged again — Transmission is also noisy.	6-1	7
Transmission has a decrease in oil level with an increase in oil in the engine.	6-1	8
Transmission gears make noise during a shift.	6-1	9
WARNING LAMPS AND ALARMS.		
Engine temperature warning lamp inoperative.	5-6	1
Engine oil pressure low warning lamp inoperative.	5-6	2
Low air pressure warning lamp and/or buzzer inoperative.	5-6	3
Backup alarm is inoperative.	5-6	4
WHEELS AND TIRES.		
Tires wearing unevenly.	10-1	1
Noisy or bumping sound while traveling on the road.	10-1	2
WINCH.		
Winch operates in one direction only.	12-1	1
Winch does not operate in either direction.	12-1	2
Winch operates at one speed only.	12-1	3
Winch will not hold suspended load.	12-1	4

Section V TORQUE INSTRUCTIONS

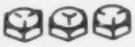
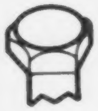
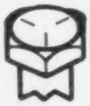
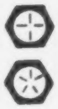
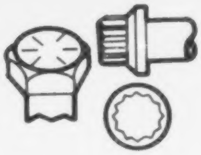
3-9. Use these guidelines when tightening bolts and capscrews:

- *a.* If the text gives a specific torque value, use it.
- *b.* Never torque engine capscrew beyond the values given for grade 5 in table 3-3.
- *c.* If no torque is specified, refer to table 3-3 for torque value.

CAUTION

Never torque an engine capscrew beyond the value given for grade 5, even if it is marked as grade 6, 7 or 8.

Table 3-3. Standard Capscrew Markings and Torque.

Current Useage	**Much Used**	**Much Used**	**Used at Times**	**Used at Times**
Minimum Tensile Strength PSI MPa	To 1/2-69,000 (476) To 3/4-64,000 (421) To 1-55,000 (379)	To 3/4-120,000 (827) To 1-115,000 (793)	To 5/8-140,000 (965) To 3/4-133,000 (917)	150,000 (1034)
Quality of Material	**Indeterminate**	**Minimum Commercial**	**Medium Commercial**	**Best Commercial**
SAE Grade Number	**1 or 2**	**5**	**6 or 7**	**8**
Capscrew Head Markings Manufacturer's marks may vary These are all SAE Grade 5 (3 line) 				

Capscrew Body Size (Inches) – (Thread)	**Torque Lb-Ft (N·m)**	**Torque Lb-Ft (N·m)**	**Torque Lb-Ft (N·m)**	**Torque Lb-Ft (N·m)**
1/4 – 20	5(7)	8(11)	10(14)	12(16)
– 28	6(8)	10(14)		14(19)
5/16 – 18	11(15)	17(23)	19(26)	24(33)
– 24	13(18)	19(26)		27(37)
3/8 – 16	18(24)	31(42)	34(46)	44(60)
– 24	20(27)	35(47)		49(66)
7/16 – 14	28(38)	49(66)	55(75)	70(95)
– 20	30(41)	55(75)		78(106)
1/2 – 13	39(53)	75(102)	85(115)	105(142)
– 20	41(56)	85(115)		120(163)
9/16 – 12	51(69)	110(149)	120(163)	155(210)
– 18	55(75)	120(163)		170(231)
5/8 – 11	83(113)	150(203)	167(226)	210(285)
– 18	95(129)	170(231)		240(325)
3/4 – 10	105(142)	270(366)	280(380)	375(508)
– 16	115(156)	295(400)		420(569)
7/8 – 9	160(217)	395(536)	440(597)	605(820)
– 14	175(237)	435(590)		675(915)
1 – 8	235(319)	590(800)	660(895)	910(1234)
– 14	250(339)	660(895)		990(1342)

1. Always use the torque values listed above when definite specifications are not available.

   Note: Do not use standard values in place of those specified in other sections of this manual; special attention should be observed when using SAE Grade 6, 7 and 8 capscrews.

2. The above is based on use of clean and dry threads.
3. Reduce torque by 10% when engine oil is used as a lubricant.
4. Reduce torque by 20% if new plated capscrews are used.

Caution: Capscrews threaded into aluminum may require reductions in torque of 30% or more, unless inserts are used.

TA 074608

CHAPTER 4

ENGINE AND ENGINE SYSTEMS MAINTENANCE

4-1. OVERVIEW.

This chapter provides you with the following information related to engine maintenance:

a. All required special tools and equipment
b. Other technical manuals
c. Troubleshooting procedures
d. Maintenance procedures

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

4-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

The special tools, TMDE, and support equipment required for the engine maintenance procedures described in this chapter are limited to the oil filter strap wrench. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

4-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

4-5. INTRODUCTION.

Procedures for troubleshooting the engine and engine systems are given in table 4-1. These procedures are limited to isolation of faulty components that can be repaired or replaced at the Organizational Maintenance level. (For repair and replacement, see section III in this chapter.) A complaint by the operator may have a variety of causes, singly or in combination. For example, in cases where internal engine parts have failed, the true cause can usually be found in one or more of the fluid systems and less frequently in the internal parts themselves. Therefore, a thorough repair would include the investigation and discovery of the faulty system.

Table 4-1. Engine and Engine Systems Troubleshooting.

MALFUNCTION.
- TEST OR INSPECTION.
  - CORRECTIVE ACTION.

1. ENGINE WILL NOT CRANK:
   - Step 1. Check battery condition.
     - Test, charge, or replace as indicated by hydrometer (para 5-7).
   - Step 2. Check battery cables and terminals for loose or dirty connections.
     - Clean and tighten connections.
   - Step 3. Check electrical starting system.
     - a. Troubleshoot starting system (para 5-8).
     - b. Notify Direct Support Maintenance.
2. ENGINE WILL CRANK BUT NOT START:
   - Step 1. Check fuel level in tank.
     - Add fuel, if required.
   - Step 2. Check fuel solenoid shutoff valve.
     - Repair, if required (para 4-16).
   - Step 3. Check for leaking fuel lines.
     - Tighten connections or replace fuel lines as required (para 4-20).
   - Step 4. Check for air cleaner element restriction.
     - Service air cleaner element (para 4-24).
   - Step 5. Check for white exhaust smoke.
     - Use cold weather starting aid (Refer to TM 9-2320-273-10).
   - Step 6. Check for dirty fuel filter.
     - Service fuel filter (para 4-18).
   - Step 7. Check for congealed fuel (cold weather).
     - Check fuel specifications (Refer to TM 9-2320-273-10).
3. ENGINE STOPS, NOT SEIZED:
   - Step 1. Refer to steps 1 thru 7 of Malfunction 2 above.
   - Step 2. Check for obstructed air vent in fuel tank.
     - Remove air vent (para 4-23), then clean.
4. ENGINE STOPS, SEIZED:
   - Refer problem to Direct Support Maintenance.

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.
    TEST OR INSPECTION.
        CORRECTIVE ACTION.

5. HIGH OIL CONSUMPTION:

Step 1. Check for overfilling.

- a. Check oil level.
- b. Determine that you have proper dipstick by matching against known proper configuration.

Step 2. Check service records to determine that proper viscosity of oil is in use. (Refer to LO 9-2320-273-12.)

Step 3. Check engine for external oil leaks with engine running.

Refer to Direct Support Maintenance for repair of oil leaks.

6. INTERMITTENT LOSS OF POWER:

Step 1. Refer to steps 1, 3 and 4 of Malfunction 2.

Step 2. Check fuel tank air vent.

Remove air vent (refer to para 4-23); then clean.

Step 3. Refer to step 6 of Malfunction 2.

Refer to Direct Support Maintenance.

7. SUDDEN LOSS OF POWER:

Step 1. Check fuel level in tank.

Step 2. Check for exhaust restriction.

- a. Check for loose baffles. Replace muffler if damaged (para 4-37).
- b. Check for damaged exhaust stack. Replace.

Step 3. Check for dirty fuel filter.

Service fuel filter (para 4-18).

Step 4. Check for leaking fuel lines.

Tighten connections or replace fuel lines as required (para 4-20).

Step 5. Check for air cleaner element restriction.

Service air cleaner element as necessary (para 4-24).

Step 6. Check for congealed fuel (cold weather).

Check fuel specification (refer to TM 9-2320-273-10).

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.
TEST OR INSPECTION.
CORRECTIVE ACTION.

8. GRADUAL LOSS OF POWER, NO SMOKE:

Step 1. Check for leaking fuel lines.
Tighten connections or replace fuel lines as required (para 4-20).

Step 2. Check for air intake restriction.
Service air intake as necessary (para 4-25).

Step 3. Check for worn accelerator rod linkage.
Adjust and replace worn parts (para 4-21).

Step 4. Check for congealed fuel (cold weather).
Check fuel specification (refer to TM 9-2320-273-10).

9. SLOW DECELERATION, ENGINE "FLOATS":

Check for air leaks in fuel pump supply lines.
Service supply lines as necessary (para 4-20).

10. ERRATIC IDLE SPEED:

Check for air leaks in fuel pump supply lines.
Service supply lines as necessary (para 4-20).

11. EXCESSIVE EXHAUST SMOKE DURING ACCELERATION:

Step 1. Check for dirty fuel filter.
Service fuel filter (para 4-18).

Step 2. Check for air crossover tube leaks (para 4-28).
a. Repair air crossover tube leaks (para 4-28).
b. Refer to Direct Support Maintenance.

12. EXCESSIVE EXHAUST SMOKE THROUGHOUT SPEED RANGE:

Step 1. Check for dirty air cleaner element.
Clean or replace element (para 4-24).

Step 2. Check for poor quality fuel.
a. Check fuel specification. (Refer to TM 9-2320-273-10).
b. Refer to Direct Support Maintenance.

13. HIGH FUEL CONSUMPTION:

Step 1. Check for poor quality fuel.
a. Check fuel specification (refer to TM 9-2320-273-10).
b. Notify Direct Support Maintenance.

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.

  TEST OR INSPECTION.

    CORRECTIVE ACTION.

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14. LOW OIL PRESSURE:

  Step 1. Check oil level.

    Fill to proper level (Refer to Lubrication Order LO 9-2320-273-12).

  Step 2. Check filter.

    Replace filter (para 4-14).

  Step 3. Check for defective oil pressure gage.

    Test pressure with a gage that is known to be good (para 5-59). If test gage indicates correct pressure, replace gage. If low or no pressure is indicated, notify Direct Support Maintenance.

15. NO CAB HEAT:

  Step 1. Check for closed heater water control valve.

    Open valve (para 4-50).

  Step 2. Check for air in heater.

    Bleed air from heater (para 4-50).

  Step 3. Check for low coolant level.

    Fill to proper level and check for leaks (para 4-42).

  Step 4. Check thermostat and thermal control (engine running cold).

    Replace thermostat (para 4-43).

16. EXCESSIVE EXHAUST NOISE:

  Step 1. Check for defective exhaust pipe or gasket(s).

    Replace defective item (para 4-34 thru 4-38, as applicable).

  Step 2. Check for defective muffler.

    Replace muffler (para 4-37).

17. EXHAUST FUMES IN CAB:

  Check for loose or defective manifold or leaks in pipes.

    Replace pipe (para 4-34 thru 4-38, as applicable) or refer to Direct Support Maintenance if manifold is defective.

18. ENGINE OVERHEATS:

  Step 1. Check coolant level.

    Add coolant until sight glass is full.

Table 4-1. Engine and Engine Systems Troubleshooting (Continued).

MALFUNCTION.
    TEST OR INSPECTION.
        CORRECTIVE ACTION.

18. ENGINE OVERHEATS (Continued):

Step 2. Check for loose or broken fan belts.
    Tighten or replace belts (para 4-45).

Step 3. Check thermostat.
    Replace thermostat (para 4-43).

Step 4. With engine running and radiator cap removed, check for proper coolant flow.
    a. Check for clogged radiator hose. Clean or replace hoses (para 4-39).
    b. Replace water pump (para 4-53).

Step 5. Check fan clutch actuator.
    a. Check actuator tubes. Replace if necessary (para 4-48 or 4-49).
    b. Replace actuator (para 4-46 or 4-47).
    c. Replace fan clutch (para 4-45).
    d. Refer problem to Direct Support Maintenance.

Section III MAINTENANCE PROCEDURES

4-6. INTRODUCTION

This section provides Organizational Level maintenance procedures for the engine and engine systems. To find a specific maintenance procedure, see one of the following lists of task summaries:

a. Engine Oil System Maintenance (para 4-7.

b. Fuel and Air Intake System Maintenance (para 4-8).

c. Engine Retarder Brake Maintenance (para 4-9).

d. Ether Quick-Start System Maintenance (para 4-10).

e. Exhaust System Maintenance (para 4-11).

f. Cooling System Maintenance (para 4-12).

g. Alternator Drive System Maintenance (para 4-13).

4-7. ENGINE OIL SYSTEM MAINTENANCE TASK SUMMARY .

INITIAL SETUP

APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION PARA.	CONDITION DESCRIPTION
All.	11-14A or C.	Left Front Fender Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil, 40 qts (Refer to Appendix C).
Containers, Five Gallon (3).
Rags.
Bypass Filter Element, 2122 (37099).
Cover Gasket, 4311 (37099).
Primary Filter Element, 299670 (15434).
Tape, Antiseizing Item 14, Appendix C.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-20P.
TM9-2320-273-10.
LO 9-2320-273-12

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Engine Oil Service:	4-14	4-1
	A. Draining oil.	4-14A	
	B. Removal of primary filter.	4-14B	
	C. Inspection of filter adapter.	4-14C	
	D. Installation of primary filter.	4-14D	
	E. Removal of bypass filter.	4-14E	
	F. Bypass filter inspection.	4-14F	
	G. Inspection/replacement of oil lines	4-14G	

4-7. ENGINE OIL SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS			
TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Engine Oil Service (Continued):		
	H. Installation of bypass filter element.	4-14H	
	I. Replenishing oil.	4-14I	
	J. Checking for leaks.	4-14J	
2.	Breather Tube Maintenance:	4-15	
	A. Removal.	4-15A	
	B. Cleaning.	4-15B	
	C. Inspection.	4-15C	
	D. Installation.	4-15D	

4-8. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
11-14A or C.	Left Front Fender Removed.
4-22A.	Hand Throttle Cable Disconnected at Throttle Mounting Bracket.
12-12A.	Winch Throttle Cable Disconnected at Throttle Mounting Bracket (M916 and M920).

MATERIALS/PARTS (P/N)

Shield (2910-00-084-7787).
O-Ring (5330-00-081-9299).
Masking Tape.
Marking Pencil.
Fuel Filter (2910-00-174-5822).
O-Ring, 213079 (15434).
Container (1 qt).
Tachometer RPM Drive Cable MA280J20000 (34623).
Outer Filter Element V250C128.
Inner Filter Element V250C127.
Container(s) (AR for fuel).
Liquid Teflon (Appendix C).
Soap Solution.
Dry Cleaning Solvent SD-2 (Appendix C).
Gasket (5330-00-951-3538).
Cap Seal Ring (5330-00-961-9470).
Cotter Pin (3), 103362 (24617).

PERSONNEL REQUIRED

One, two or three (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.
TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.
Work in well ventilated area.
Darkened area for filter check.
Work area must be clean as dirt in the air passages can damage the turbocharger and engine.

GENERAL SAFETY INSTRUCTIONS

Engine off.
Transmission in Neutral.
Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Fuel Solenoid Shutoff Valve Maintenance:	4-16	4-1
	A. Removal.	4-16A	
	B. Installation.	4-16B	
	C. Operational Check.	4-16C	
2.	Fuel Pump Screen Maintenance:	4-17	
	A. Removal.	4-17A	
	B. Cleaning.	4-17B	

4-3. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Fuel Pump Screen Maintenance (Continued) :		
	C. Installation.	4-17C	
	D. Checking for leaks.	4-17D	
3.	Fuel Filter Maintenance:	4-18	4-1
	A. Removal.	4-18A	
	B. Installation.	4-18B	
	C. Checking for leaks.	4-18C	
4.	Tachograph RPM Cable Maintenance:	4-19	
	A. Removal.	4-19A	
	B. Installation.	4-19B	
	C. Operational check.	4-19C	
5.	Lines, Hoses, and Fittings Maintenance.	4-20	4-1
6.	Accelerator Pedal and Rod Maintenance:	4-21	4-1
	A. Removal.	4-21A	
	B. Installation.	4-21B	
	C Checking idle speed.	4-21C	
7.	Hand Throttle Linkage Maintenance:	4-22	
	A. Removal.	4-22A	
	B. Cleaning and inspection.	4-22B	
	C. Installation.	4-22C	
	D. Checking idle speed.	4-22D	
8.	Fuel Tank Maintenance:	4-23	4-1
	A. Removal.	4-23A	
	B. Installation.	4-23B	
	C. Checking for leaks.	4-23C	

4-8. FUEL AND AIR INTAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
9.	Air Cleaner Element Maintenance:	4-24	4-1
	A. Removal.	4-24A	
	B. Cleaning.	4-24B	
	C. Installation	4-24C	
10.	Air Cleaner Assembly Maintenance:	4-25	4-1
	A. Removal of filter assembly.	4-25A	
	B. Removal of brackets & fittings.	4-25B	
	C. Installation of brackets & fittings.	4-25C	
	D. Installation of filter assembly.	4-25D	
11.	Air Cleaner Restriction Indicator Maintenance:	4-26	
	A. Removal of indicator.	4-26A	
	B. Installation of indicator.	4-26B	
	C. Removal of tube and filter.	4-26C	
	D. Installation of tube and filter.	4-26D	
12.	Turbo Air Inlet Maintenance:	4-27	
	A. Removal.	4-27A	
	B. Inspection.	4-27B	
	C. Installation.	4-27C	
	D. Checking for leaks.	4-27D	

4-9. ENGINE RETARDER BRAKE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Dry cleaning solvent (Refer to Appendix C).
Crossover tube gasket (center cover only) (216487).
Gasket, rocker arm housing (3009999).

PERSONNEL REQUIRED

One, or two (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
TM9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 5-4.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
4-15A.	Breather tube removed.
4-27A.	Turbo air inlet removed.
4-28A&B.	Rocker arm housing covers removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Work area must be clean, as dirt in the turbocharger and engine can cause damage. Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine off; transmission in neutral.
Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Rocker Arm Housing Covers Maintenance:	4-28	5-4
	A. Removal of crossover tube.	4-28A	
	B. Removal of cover.	4-28B	
	C. Cleaning.	4-28C	
	D. Installation of cover.	4-28D	
	E. Installation of crossover tube.	4-28E	
2.	Engine Retarder Brake Maintenance:	4-29	5-4
	Inspection.	4-29	

4-10. ETHER QUICK-START SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Ether cylinder (2910-01-072-1783).
Solenoid valve, 913032-04 (06991).
Atomizer, 91302406 (06991).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
TM9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 5-3.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
4-30A.	Ether Cylinder Removed.
9-11A.	Alcohol Evaporator Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Work in well ventilated area.
Vehicle parked on level ground.
Coolant temperature must be below 50°F or ether button will not function.

GENERAL SAFETY INSTRUCTIONS

Ether is highly explosive, dispose of cylinder properly. Be alert for the strong odor of spilled ether. Guard against flame or sparks in work area. Engine off; tansmission in neutral. Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Ether Cylinder Maintenance:	4-30	5-3
	A. Removal.	4-30A	
	B. Installation.	4-30B	
	C. Operational check.	4-30C	
2.	Solenoid Valve Maintenance:	4-31	5-3
	A. Removal.	4-31A	
	B. Installation.	4-31B	

4-10. ETHER QUICK-START SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Atomizer Maintenance:	4-32	5-3
	A. Removal.	4-32A	
	B. Installation and operational check.	4-32B	
4.	Ether Tube Maintenance:	4-33	5-3
	A. Removal.	4-33A	
	B. Inspection.	4-33B	
	C. Installation.	4-33C	
	D. Operational check.	4-33D	

4-11. EXHAUST SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Locknut (M916/M920) M1219B-20002 (34623).
Couplings (5) 5.0 - 1236 BJ (76700).
(3) 5.0 - 1256 LJ (76700).
5.0 - 1259 LJ (76700).

PERSONNEL REQUIRED

One or two (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
TM9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Wait until exhaust components are cool.
Engine off; transmission in neutral.
Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Turbo Outlet Pipe Maintenance:	4-34	4-1
	A. Removal.	4-34A	
	B. Inspection of mating flanges.	4-34B	
	C. Installation.	4-34C	
	D. Checking for leaks.	4-34D	
2.	Flex Pipes Maintenance:	4-35	4-1
	A. Removal.	4-35A	
	B. Inspection of mating flanges.	4-35B	

4-11. EXHAUST SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Flex Tubes Maintenance (Continued):		
	C. Installation.	4-35C	
	D. Checking for leaks.	4-35D	
3.	Muffler Inlet Pipe Maintenance:	4-36	4-1
	A. Removal.	4-36A	
	B. Inspection of mating flanges.	4-36B	
	C. Installation.	4-36C	
	D. Checking for leaks.	4-36D	
4.	Muffler Maintenance:	4-37	4-1
	A. Removal.	4-37A	
	B. Inspection of mating flanges.	4-37B	
	C. Installation.	4-37C	
	D. Checking for leaks.	4-37D	
5.	Exhaust Stack Maintenance:	4-38	
	A. Removal.	4-38	
	B. Inspection of mating flanges and rain cap.	4-38B	
	C. Installation.	4-38C	
	D. Checking for leaks.	4-38D	

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Belt tension gage.

SPECIAL TOOLS

Thermostat mandrel No. 139.

MATERIALS/PARTS (P/N)

Insulators (2) CBA24-500 (76005)
Liquid teflon (refer to appendix C).
Container (60 qt min).
Gasket (6620-00-047-2811).
Rubber seal (5330-00-864-5422).
O-Rings (4) (5330-00-506-4874).
Sealing rings (6) (5330-00-143-8369).
Gasket, 210859 (15434).
Soap solution.
Gasket, 3011931 (15434).
Gasket, 208132 (15434).
Gasket, water pump to engine block (5330-01-066-5350).
Gasket, water pump to heater manifold 208132 (15434).

PERSONNEL REQUIRED

One or two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
4-41A.	Upper fan shroud removed.
4-42A.	Coolant drained.
4-49A, 4-51A, 4-47A.	Water pump belt removed.
4-46A.	Fan clutch actuator removed.
4-25A.	Air cleaner removed.
4-41A.	Upper shroud & fan removed.
4-44A.	Fan removed.
4-45A.	Fan belts removed.
6-10A.	Transmission oil cooler hoses removed.
5-73A.	Water temperature switch wire removed.
4-27A.	Turbo air inlet removed
11-29A, 11-32A.	Hood removed
11-16E.	Brush guard removed (M916/M920).
11-16A.	Grille removed.
10-22A.	Steering pump cooler hoses removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine off; transmission in neutral.
Park brake set.

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Radiator Hoses Maintenance:	4-39	4-1
	A. Inspection.	4-39A	
	B. Removal.	4-39B	
	C. Installation.	4-39C	
2.	Radiator Maintenance:	4-40	4-1
	A. Removal.	4-40A	
	B. Installation.	4-40B	
3.	Fan Shrouds Maintenance:	4-41	
	A. Removal.	4-41A	
	B. Installation.	4-41B	
4.	Coolant System Maintenance:	4-42	4-1
	A. Drain.	4-42A	
	B. Inspection/installation of draincocks	4-42B	
	C. Replenishing coolant.	4-42C	
	D. Checking for leaks.	4-42D	
5.	Thermostat and Housing Maintenance:	4-43	4-1
	A. Removal.	4-43A	
	B. Testing.	4-43B	
	C. Installation.	4-43C	
	D. Operational check.	4-43D	
6.	Fan Maintenance:	4-44	4-1
	A. Removal.	4-44A	
	B. Installation.	4-44B	
	C. Operational check.	4-44C	

4-12. COOLING SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Fan Clutch and Belts Maintenance:	4-45	
	A. Removal.	4-45A	
	B. Inspection.	4-45B	
	C. Installation.	4-45C	
	D. Adjustment.	4-45D	
8.	Fan Clutch Actuator Maintenance (M915, M916, M917, M918, and M920):	4-46	4-1
	A. Removal.	4-46A	
	B. Inspection of air tubes.	4-46B	
	C. Installation.	4-46C	
	D. Operational check.	4-46D	
9.	Fan Clutch Actuator and Valve Maintenance (M919):	4-47	4-1
	A. Removal.	4-47A	
	B. Inspection of air tubes.	4-47B	
	C. Installation.	4-47C	
	D. Operational check.	4-47D	
10.	Fan Clutch Actuator Tubes Maintenance (M915, M916, M917, M918, and M920):	4-48	4-1
	A. Removal.	4-48A	
	B. Installation.	4-48B	
	C. Checking for leaks.	4-48C	
11.	Fan Clutch Actuator Tubes Maintenance (M919):	4-49	4-1
	A. Removal.	4-49A	
	B. Inspection.	4-49B	
	C. Installation.	4-49C	
	D. Checking for leaks.	4-49D	

4-12. COOLING SYSTEM MAINTNANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
12.	Heater Shutoff Valve Maintenance:	4-50	4-1
	A. Removal.	4-50A	
	B. Installation.	4-50B	
	C. Bleeding heater.	4-50C	
13.	Water Pump Belt Maintenance:	4-51	
	A. Removal.	4-51A	
	B. Installation.	4-51B	
	C. Adjustment.	4-51C	
14.	Water Manifold Maintenance:	4-52	
	A. Removal.	4-52A	
	B. Inspection.	4-52B	
	C. Installation.	4-52C	
15.	Water Pump Maintenance:	4-53	4-1
	A. Removal.	4-53A	
	B. Installation.	4-53B	
16.	Water Pump Idler Pulley Maintenance:	4-54	
	A. Removal.	4-54A	
	B. Installation.	4-54B	
	C. Operational check.	4-54C	
	NOTE Maintenance procedures for the water temperature switch and transmitter are given in Chapter 5, section III.		

4-13. ALTERNATOR DRIVE SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Belt tension gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20)

REFERENCES (TM)

TM9-2320-273-10

REFERENCES (TROUBLESHOOTING)

Table 4-1.

EQUIPMENT CONDITION PARA	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle parked on level ground.

GENERAL SAFETY INSTRUCTIONS

Engine off; transmission in neutral.
Park brake set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Alternator Belts Maintenance:	4-55	
	A. Removal.	4-55A	
	B. Installation.	4-55B	
	C. Adjustment	4-55C	

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OIL SYSTEM

4-14. ENGINE OIL SERVICE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Draining Oil.	(15)	g. Inspection/Replacement of Oil Lines.	(10)
b. Removal of Primary Filter.	(10)	h. Installation of Bypass Filter.	(15)
c. Inspection of Filter Adapter.	(5)	i. Replenishing Oil.	(15)
d. Installation of Primary Filter.	(10)	j. Checking for Leaks.	(10)
e. Removal of Bypass Filter.	(10)		
f. Bypass Filter Inspection.	(5)		105 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil, 40 Qts (Refer to Appendix C).
Containers (Three 5-gal buckets).
Rag, Wiping.
Bypass Filter Element, 2122 (37099).
Cover Gasket, 4311 (37099).
Primary Oil Filter, 299670 (15434).
Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-14 A or C.	Left Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.
LO 9-2320-273-12.
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

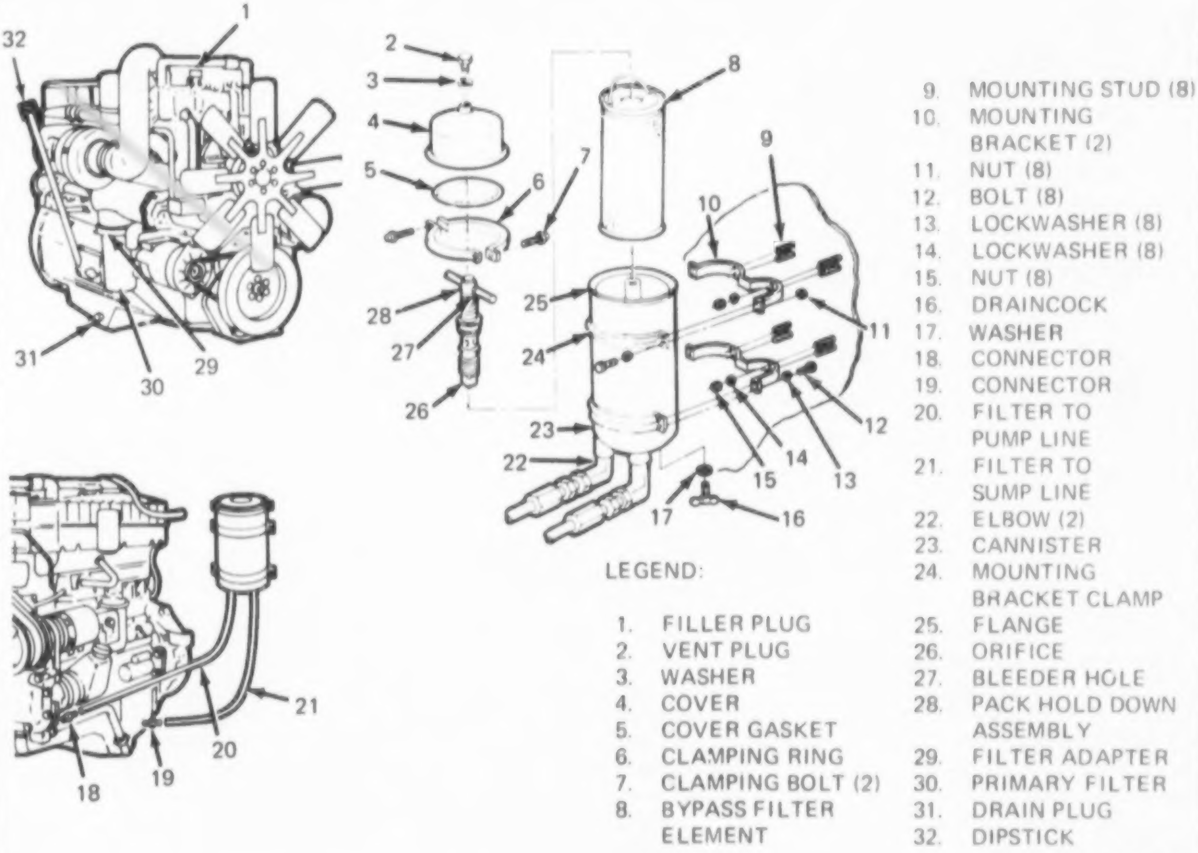
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
	NOTE Place container under crankcase drain plug (31) to catch oil.	
1. Vent plug (2) and washer (3).	Unscrew and remove.	Allow sufficient time for oil to drain from bypass filter to crankcase.
2. Drain plug (31).	a. Unscrew and remove. b. Allow all oil to drain out. c. Inspect magnet for foreign particles and wipe clean. d. Screw in and tighten	Oil should be drained from a warm engine. Stop flow by reinserting plug to change containers.



LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAINCOCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANNISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

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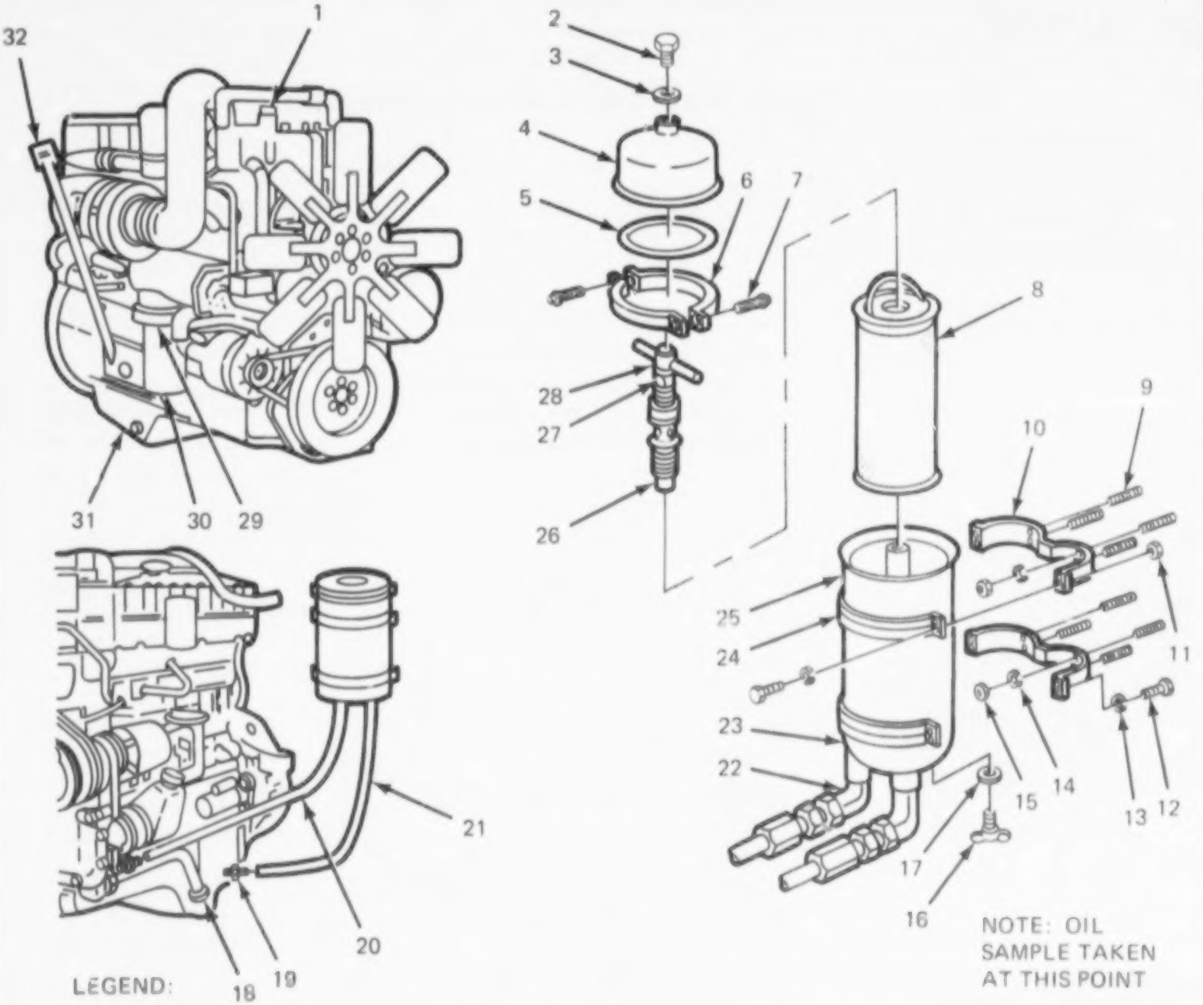
OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS



NOTE: OIL SAMPLE TAKEN AT THIS POINT

LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAIN COCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

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4-14. ENGINE OIL SERVICE (Continued).

A.1. OIL SAMPLE FOR ANALYSIS.

NOTE

Before beginning this task check engine oil level according to Operator's manual (TM 9-2320-273-10).

Start engine (see TM 9-2320-273-10), warm vehicle to normal operating range and stop engine.

LOCATION/ITEM	ACTION	REMARKS
1. Draincock (16).	a. Unscrew and loosen.	When taking a sample, first use a container to drain a small amount of oil to clean the valve assembly.
	b. When completed with task 1., use the proper bottle and take oil sample from the oil bypass filter drain valve as shown in illustration on page 4-26, item 16. c. Check oil level to insure proper level after sampling.	

B. REMOVAL OF PRIMARY FILTER.

NOTE

Place container under primary filter (30) to catch oil.

LOCATION/ITEM	ACTION	REMARKS
3. Primary filter (30).	Unscrew using filter wrench. Throw filter away.	

C. INSPECTION OF FILTER ADAPTER.

LOCATION/ITEM	ACTION	REMARKS
4. Filter adapter (29).	Inspect for: a. Cracks. b. Nicks. c. Damaged threads.	If adapter is defective, notify Direct Support.

OIL SYSTEM

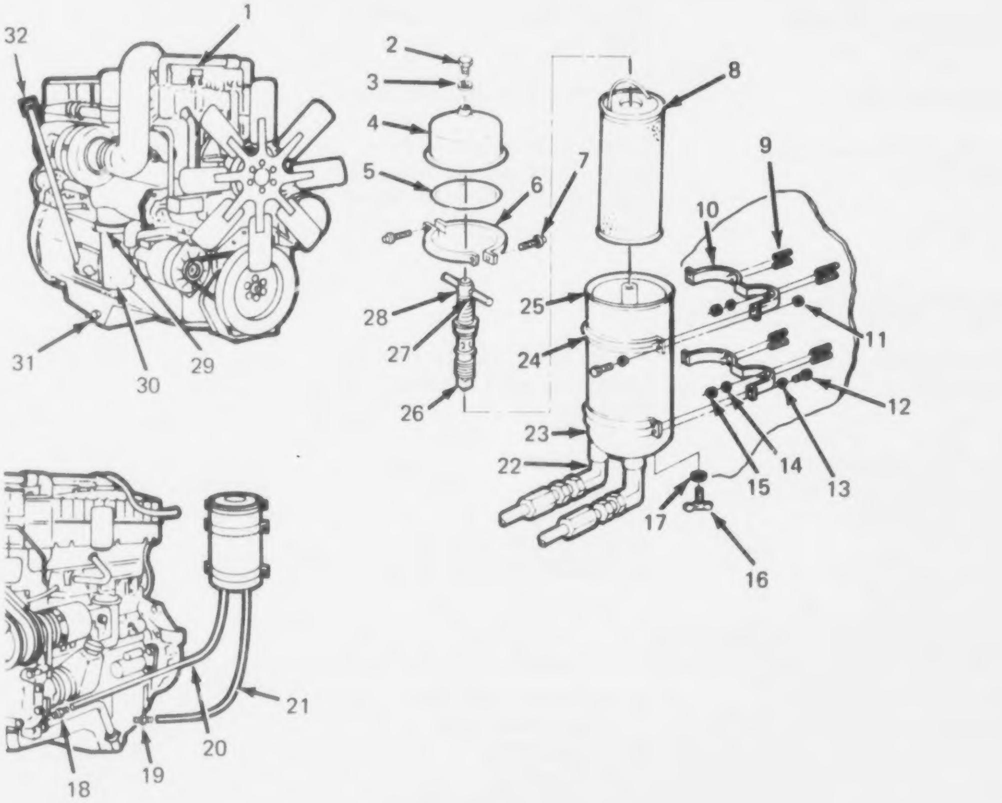
4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION OF PRIMARY FILTER.		
5. New primary filter (30).	a. Apply lube to seal. b. Screw into filter adapter (29) and tighten by hand.	Do not use filter wrench.
E. REMOVAL OF BYPASS FILTER.		
	NOTE Place container under bypass filter draincock (16) to catch oil.	
6. Bypass filter draincock (16) and washer (17).	a. Remove and allow oil to drain out. b. Screw in and tighten.	
7. Two clamping bolts (7).	Unscrew and remove.	
8. Clamping ring (6).	Remove.	
9. Cover (4) and cover gasket (5).	Remove.	Discard cover gasket (5).
10. Pack hold down assembly (28).	Unscrew and remove.	
11. Bypass filter element (8).	Remove and discard.	
12. Filter to pump line (20) and filter to sump line (21).	Unscrew and remove from two elbows (22).	
13. Eight bolts (12), lockwashers (13) and nuts (11).	Unscrew and remove.	

OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAINCOCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

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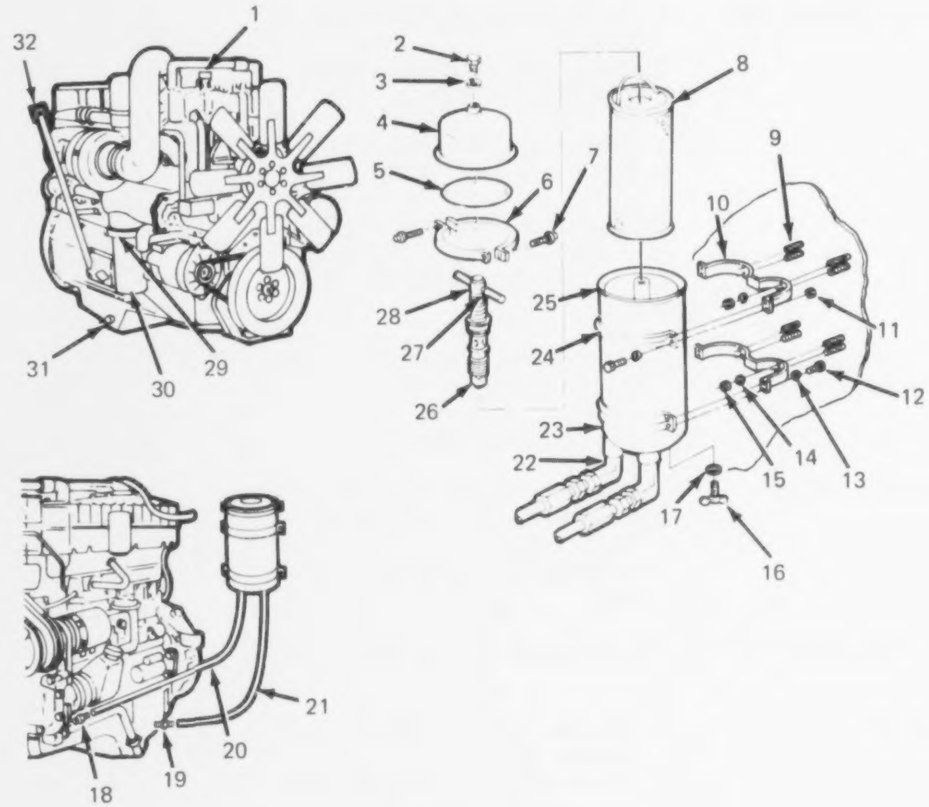
4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. REMOVAL OF BYPASS FILTER (Continued).		
14. Two mounting bracket clamps (24).	Lift off and remove canister (23).	
15. Two elbows (22).	Unscrew from canister (23).	
16. Eight nuts (15) and lockwashers (14).	Unscrew and remove two mounting brackets (10) from eight mounting studs (9) at firewall.	
F. BYPASS FILTER INSPECTION.		
17. Orifice (26) and bleeder hole (27).	Holes should not be blocked. Clean out with a piece of wire if necessary.	
18. Mounting brackets (10), clamps (24), canister (23) and elbows (22).	Inspect for: a. Damage. b. Looseness. c. Stains from leaks. d. Crossed threads.	Replace any damaged components if necessary.
G. INSPECTION/REPLACEMENT OF OIL LINES.		
19. Filter to pump line (20) and filter to sump line (24).	a. Unscrew from two connectors (18). b. Inspect for: 1. Cracks. 2. Stains from leaks. 3. Kinks. 4. End fitting damage.	
20. Two connectors (18) and (19).	a. Unscrew from oil pump and oil sump. b. Coat threads with liquid teflon. c. Screw into oil pump and oil sump.	Replace if threads are damaged.
21. Filter to pump line (20) and filter to sump line (21).	Screw onto connectors (18) and (19).	

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAINCOCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

TA 074611

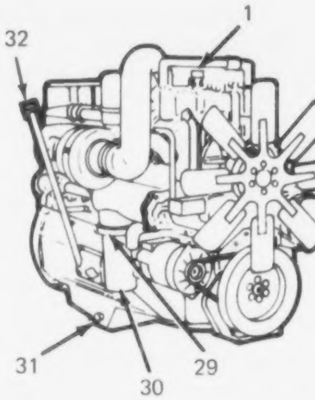
OIL SYSTEM

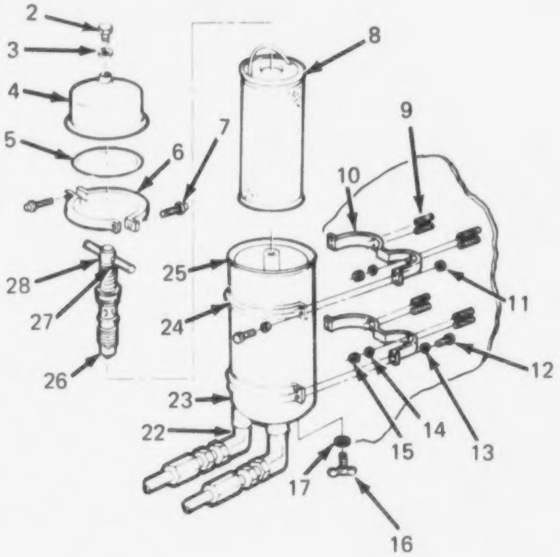
4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
H. INSTALLATION OF BYPASS FILTER.		
22. Two mounting brackets (10).	a. Position over eight mounting studs (9). b. Secure with eight lockwashers (14) and nuts (15).	
23. Two elbows (22).	a. Coat threads with liquid teflon. b. Screw into canister (23).	
24. Canister (23).	Secure to two mounting brackets (10) with two clamps (24), eight bolts (12), lockwashers (13), and nuts (11).	
25. Filter to pump line (20) and and filter to sump line (21).	Screw onto two elbows (22).	
26. Bypass filter element (8).	Place into canister (23).	
27. Pack hold down assembly (28).	a. Place thru center of bypass filter element (8) in canister (23). b. Screw all the way down to the stop.	
28. Cover (4) and new cover gasket (5).	Set in place on canister flange (25).	
29. Clamping ring (6).	a. Position over cover (4) and canister flange (25). b. Secure with two clamping bolts (7); draw up bolts until they stop against shoulder.	
30. Vent plug (2) and washer (3).	Install at cover (4) and tighten.	
I. REPLENISHING OIL.		
31. Filler cap (1).	a. Remove. b. Pour oil thru filler cap opening. c. Tighten filler cap.	See LO 9-2320-273-12. OEA IF SUB-ZERO.
J. CHECKING FOR LEAKS.		
32. Engine.	a. Start up. b. Run 3-5 minutes, shut off and let set 8-10 minutes.	See TM 9-2320-273-10.

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM ACTION REMARKS

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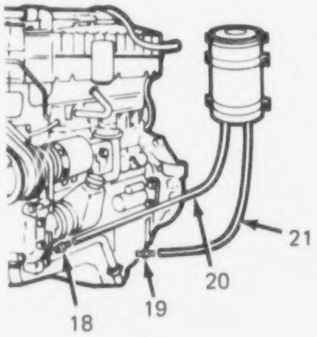


LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAINCOCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

TA 075364

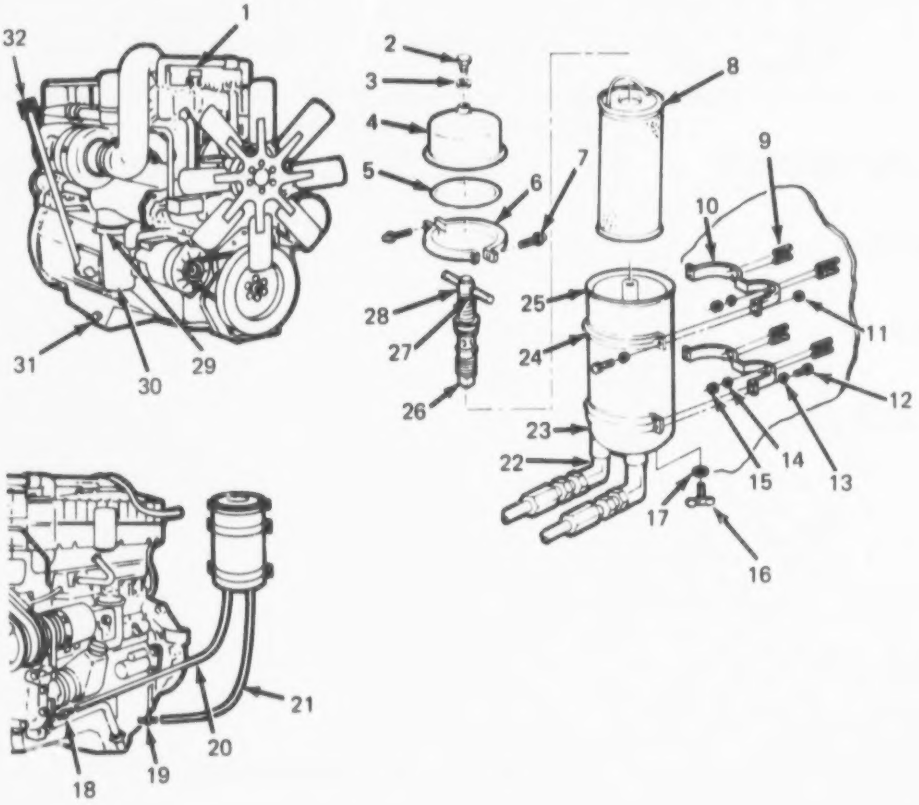
OIL SYSTEM

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
J. CHECKING FOR LEAKS (Continued).		
33. Dipstick (32).	Pull out and check oil level. Should be near "H" mark.	If oil level is far above or below mark, check to be sure you have the correct dipstick for the NTC 400 engine.
34. Primary filter (30), drain plug (31), connectors (18) and (19), two elbows (22), drain cock (16), cover (4), filter to pump line (20) and filter to sump line (21).	Check for leaks.	Tighten as necessary.

4-14. ENGINE OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. FILLER PLUG
2. VENT PLUG
3. WASHER
4. COVER
5. COVER GASKET
6. CLAMPING RING
7. CLAMPING BOLT (2)
8. BYPASS FILTER ELEMENT
9. MOUNTING STUD (8)
10. MOUNTING BRACKET (2)
11. NUT (8)
12. BOLT (8)
13. LOCKWASHER (8)
14. LOCKWASHER (8)
15. NUT (8)
16. DRAINCOCK
17. WASHER
18. CONNECTOR
19. CONNECTOR
20. FILTER TO PUMP LINE
21. FILTER TO SUMP LINE
22. ELBOW (2)
23. CANISTER
24. MOUNTING BRACKET CLAMP
25. FLANGE
26. ORIFICE
27. BLEEDER HOLE
28. PACK HOLD DOWN ASSEMBLY
29. FILTER ADAPTER
30. PRIMARY FILTER
31. DRAIN PLUG
32. DIPSTICK

TA 075635

OIL SYSTEM

4-15. BREATHER TUBE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Cleaning.	(15)
c. Inspection.	(5)
d. Installation.	(5)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

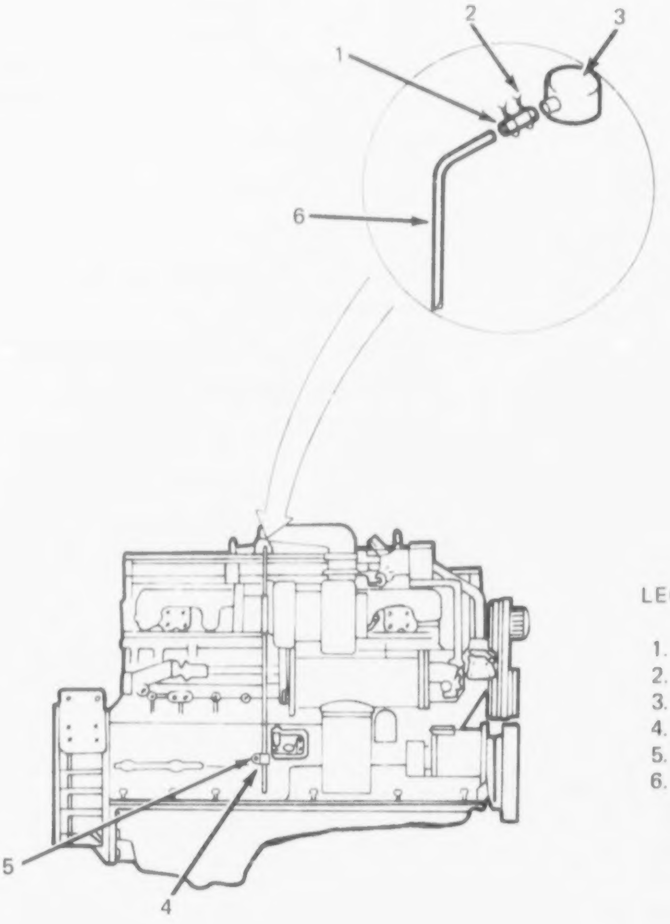
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two clamps (2), and line (1).	Remove from breather cup (3).	
2. Tube (6).	Remove by loosening capscrews (5), and pulling tube (6) out of loop clamp (4).	



LEGEND:

1. LINE
2. CLAMP (2)
3. BREATHER CAP
4. LOOP CLAMP
5. CAPSCREW
6. TUBE

TA 074612

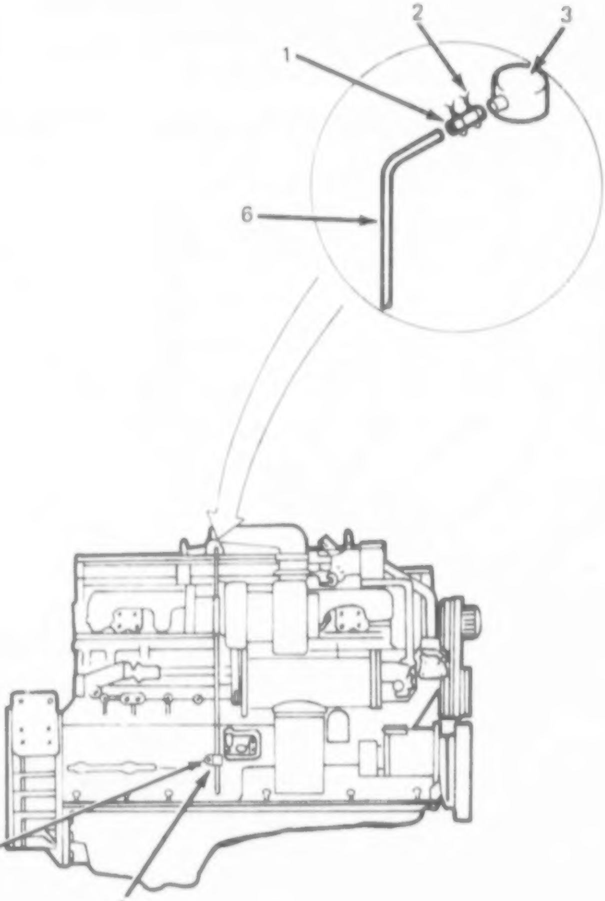
4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING.		
3. Tube (6).	Immerse and flush in solvent.	
C. INSPECTION.		
4. Tube (6).	Check for: a. Cracks. b. Nicks. c. Dents.	If tube (6) is defective, replace.
5. Line (1).	Check for cracks.	If line (1) is defective, replace.
D. INSTALLATION.		
6. Line (1).	Attach to breather tube cap (3).	
7. Clamps (2).	Put on line (1).	
8. Tube (6).	Push into line (1) and loop clamp (4).	
9. Clamps (2).	Tighten capscrew (5).	
	Put into place.	

OIL SYSTEM

4-15. BREATHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. LINE
2. CLAMP (2)
3. BREATHER CAP
4. LOOP CLAMP
5. CAPSCREW
6. TUBE

TA 074613

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
c. Operational Check.	(5)
	25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Shield (2910-00-084-7787).
O-Ring (5330-00-081-9299).
Gasket (5330-00-951-3538).
Masking Tape.
Marking Pencil.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-14 A or C.	Left Fender Removed.

PERSONNEL REQUIRED

Two (MOS-63B20). (2nd mechanic turns engine run switch in part C.).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Work in Well Ventilated Area.
Vehicle Parked on Level Ground.

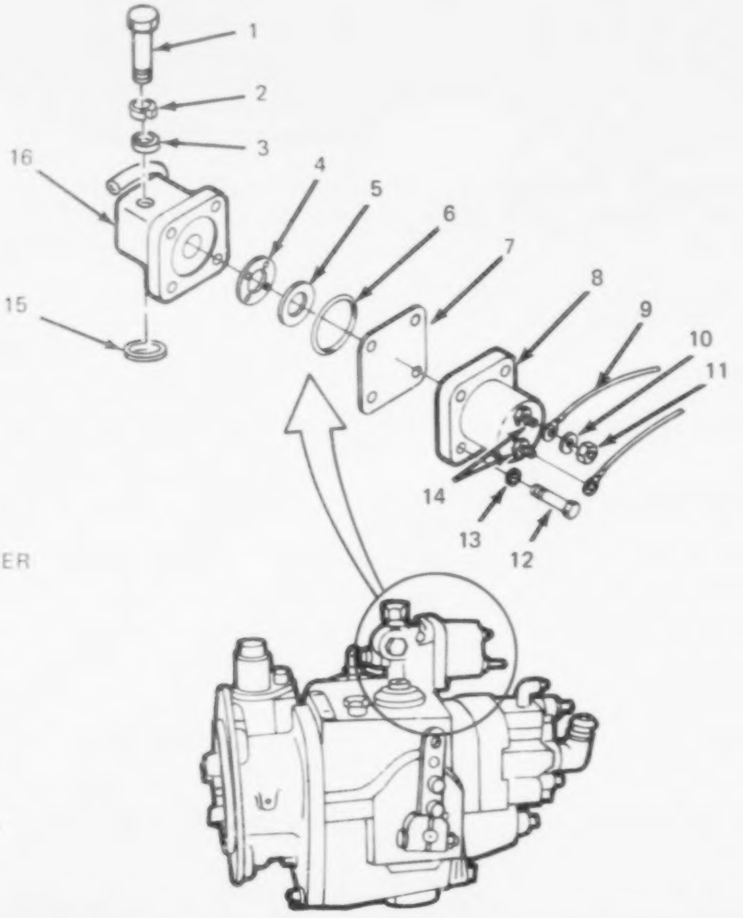
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two nuts (11) and washers (10).	Unscrew and remove.	Hold rear nut with wrench as front nut is being loosened.
2. Two wires (9).	Remove from terminals (14).	Mark wires for installation reference, using masking tape and marking pencil.
3. Four screws (12) and washers (13).	Unscrew and remove.	



LEGEND:

1. SCREW (2)
2. WASHER (2)
3. WASHER (2)
4. VALVE
5. SPRING WASHER
6. O-RING
7. SHIELD
8. COIL ASSEMBLY
9. WIRE (2)
10. WASHER (2)
11. NUT (2)
12. SCREW (4)
13. WASHER (4)
14. TERMINAL (2)
15. GASKET
16. VALVE

TA 074614

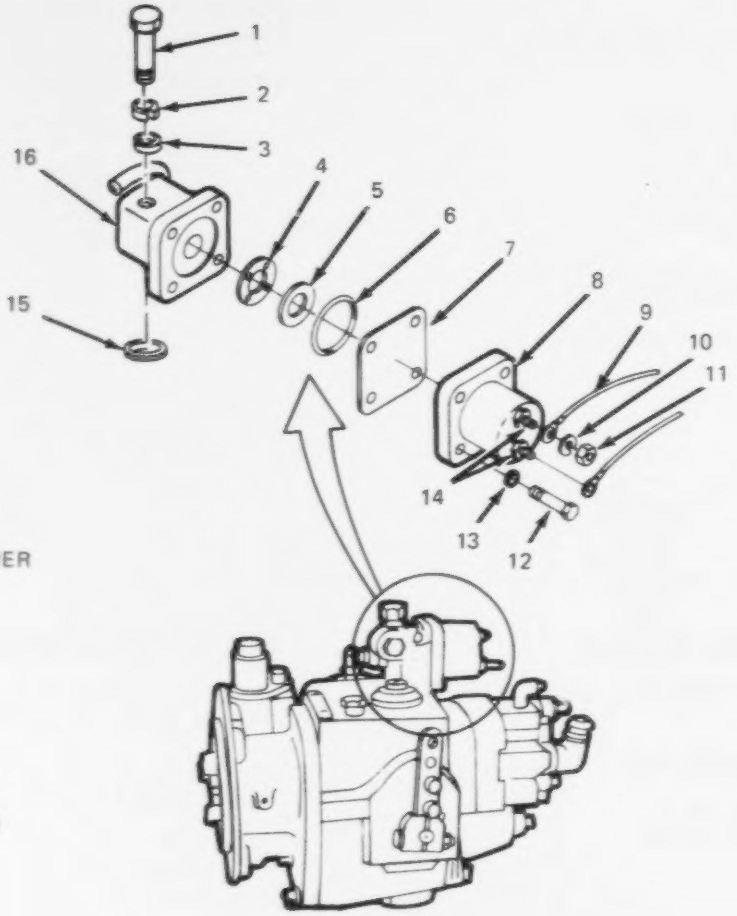
best copy available

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Coil assembly (8), shield (7), O-ring (6), spring washer (5), and valve (4).	a. Remove. b. Throw away shield (7), and O-ring (6).	
5. Two screws (1), and two washers (2 and 3).	Unscrew and remove.	
6. Valve (16), and gasket (15).	a. Remove valve. b. Throw away gasket.	
B. INSTALLATION.		
7. Gasket (15), valve (16), two washers (2 and 3), and two screws (1).	a. Hold gasket (15) and valve (16), in place and insert two screws (1) and washers (2 and 3). b. Tighten screws (1).	
8. Coil assembly (8), shield (7), O-ring (6), spring washer (5), and valve (4).	Hold in place. Insert four screws (12), and washers (13).	
9. Four mounting screws (12), and washers (13).	Tighten.	
10. Two wires (9).	Attach to terminals (14).	
11. Nuts (11), and washers (10).	Install on terminals and tighten.	
C. OPERATIONAL CHECK.		
12. INSTRUMENT PANEL/ engine run switch.	Turn ON, and OFF again.	2nd mechanic.
13. Coil assembly (8).	Listen for "click" when run switch is turned ON or OFF.	1st mechanic.
14. Engine.	Start up (see TM 9-2320-273-10).	Engine will not start unless solenoid is working.
15. Coil assembly (8).	Check valve for leaks.	

4-16. FUEL SOLENOID SHUTOFF VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SCREW (2)
2. WASHER (2)
3. WASHER (2)
4. VALVE
5. SPRING WASHER
6. O-RING
7. SHIELD
8. COIL ASSEMBLY
9. WIRE (2)
10. WASHER (2)
11. NUT (2)
12. SCREW (4)
13. WASHER (4)
14. TERMINAL (2)
15. GASKET
16. VALVE

TA 074615

4-17. FUEL PUMP SCREEN MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Cleaning.	(10)
c. Installation.	(10)
d. Checking for Leaks.	(5)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cap Seal Ring (5330-00-961-9470).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-14 A or C.	Left Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

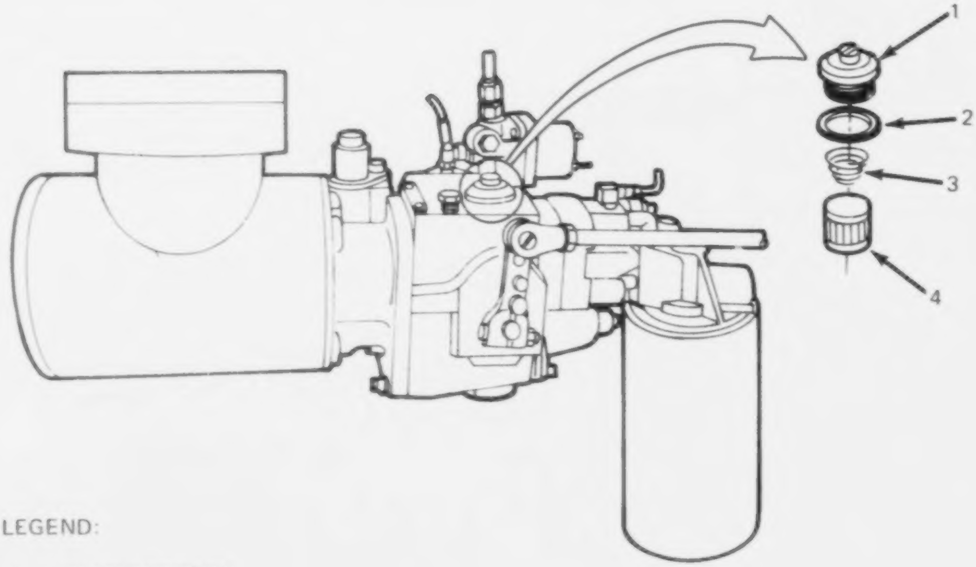
Work in Well Ventilated Area.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Filter screen cap (1).	Unscrew and remove.	
2. Cap seal ring (2), filter spring (3), and fuel filter screen assembly (4).	a. Take out. b. Throw away cap seal ring (2).	
B. CLEANING.		
3. Fuel filter screen assembly (4).	Clean.	



LEGEND:

1. FILTER SCREEN
2. CAP SEAL RING
3. FILTER SPRING
4. FUEL FILTER SCREEN ASSEMBLY

TA 074616

FUEL AND AIR INTAKE SYSTEM.

4-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
4. Fuel filter screen assembly (4).	Drop into place.	Opening must be down.
5. Filter spring (3) and new cap seal ring (2).	Set into place.	
6. Filter screen cap (1).	Screw in.	
D. CHECKING FOR LEAKS.		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Filter screen cap (1).	Look for leaking around edges.	

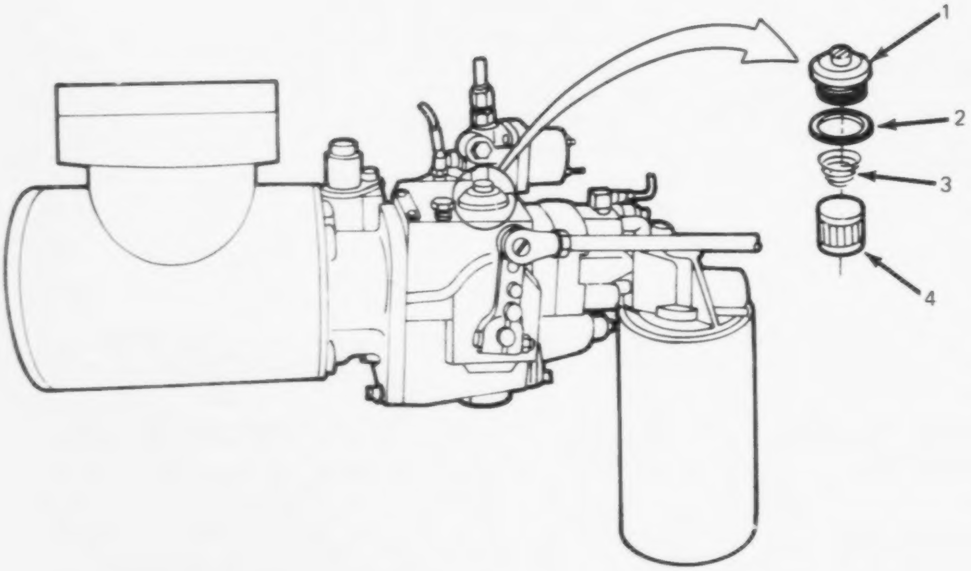
NOTE

Follow-on maintenance required. Install left fender; refer to para 11-14.

FUEL AND AIR INTAKE SYSTEM.

4-17. FUEL PUMP SCREEN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FILTER SCREEN
2. CAP SEAL RING
3. FILTER SPRING
4. FUEL FILTER SCREEN ASSEMBLY

TA 074617

FUEL AND AIR INTAKE SYSTEM.

4-18. FUEL FILTER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
c. Checking for leaks.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Fuel Filter (2910-00-174-5822).
O-Ring, 213079 (15434).
Container (1 qt).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-14 A or C.	Left Fender Removal.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-20P.
TM9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

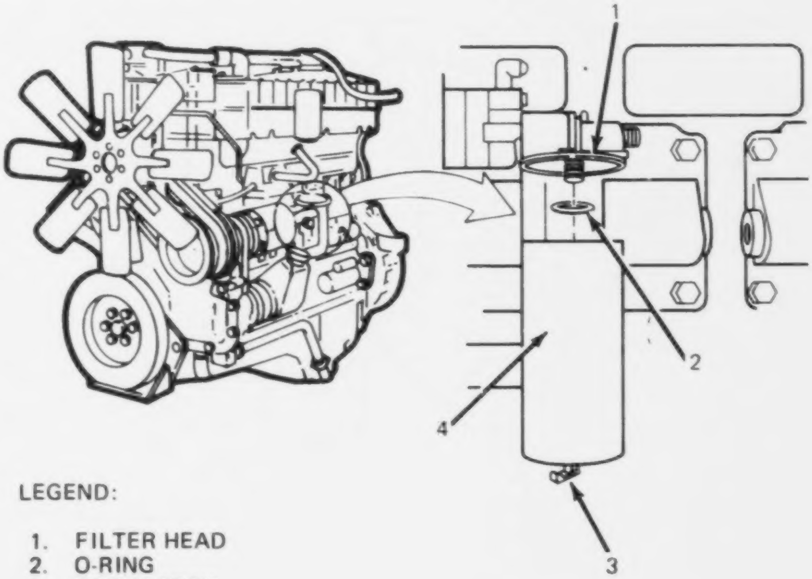
Vehicle Parked on Level Ground.
Work in Well Ventilated Area.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

4-18. FUEL FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Fuel filter (4).	a. Open draincock (3) and drain fuel into suitable container.	Unscrew draincock for use in new replacement filter.
	b. Unscrew and remove.	
2. O-ring (2).	Remove and throw away.	
B. INSTALLATION.		
3. New fuel filter (4).	a. Install draincock (3).	
	b. Fill with clean fuel.	
	c. Install new O-ring (2).	
	d. Screw in until seal just touches filter head (1).	Do not tighten with wrench.
	e. Screw in one-half turn to three-fourths turn more.	



LEGEND:

1. FILTER HEAD
2. O-RING
3. DRAIN COCK
4. FUEL FILTER

TA 074618

4-18. FUEL FILTER MAINTENANCE (Continued).

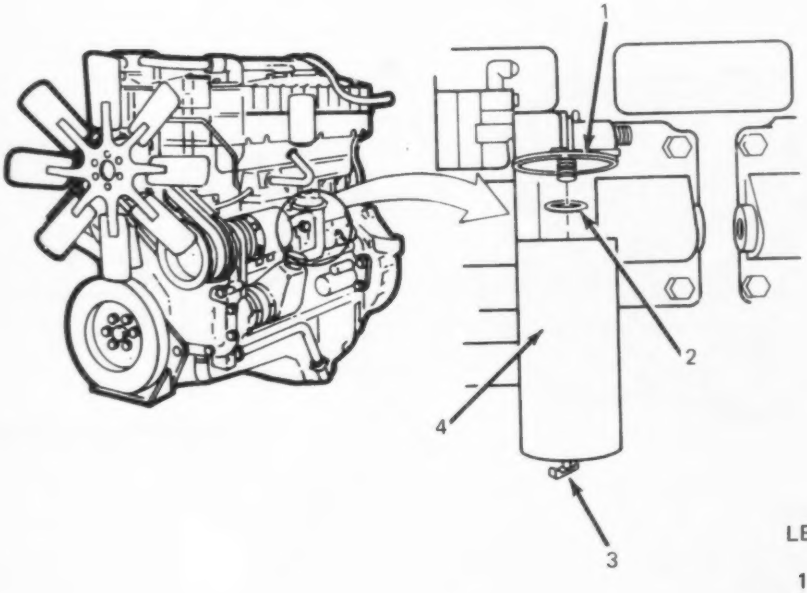
C. CHECKING FOR LEAKS.

LOCATION/ITEM	ACTION	REMARKS
4. Engine.	Start up (see TM 9-2320-273-10).	
5. Fuel filter (4).	Check for leaks.	

NOTE

Follow-on maintenance action required:

Install left fender; refer to para 11-14.



LEGEND:

1. FILTER HEAD
2. O-RING
3. DRAIN COCK
4. FUEL FILTER

TA 074619

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4-19. TACHOGRAPH RPM CABLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Installation.	(6)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tachometer RPM Cable, MA280J20000 (34623).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Disconnect Batteries.
11-14 A or C.	Left Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
TM9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

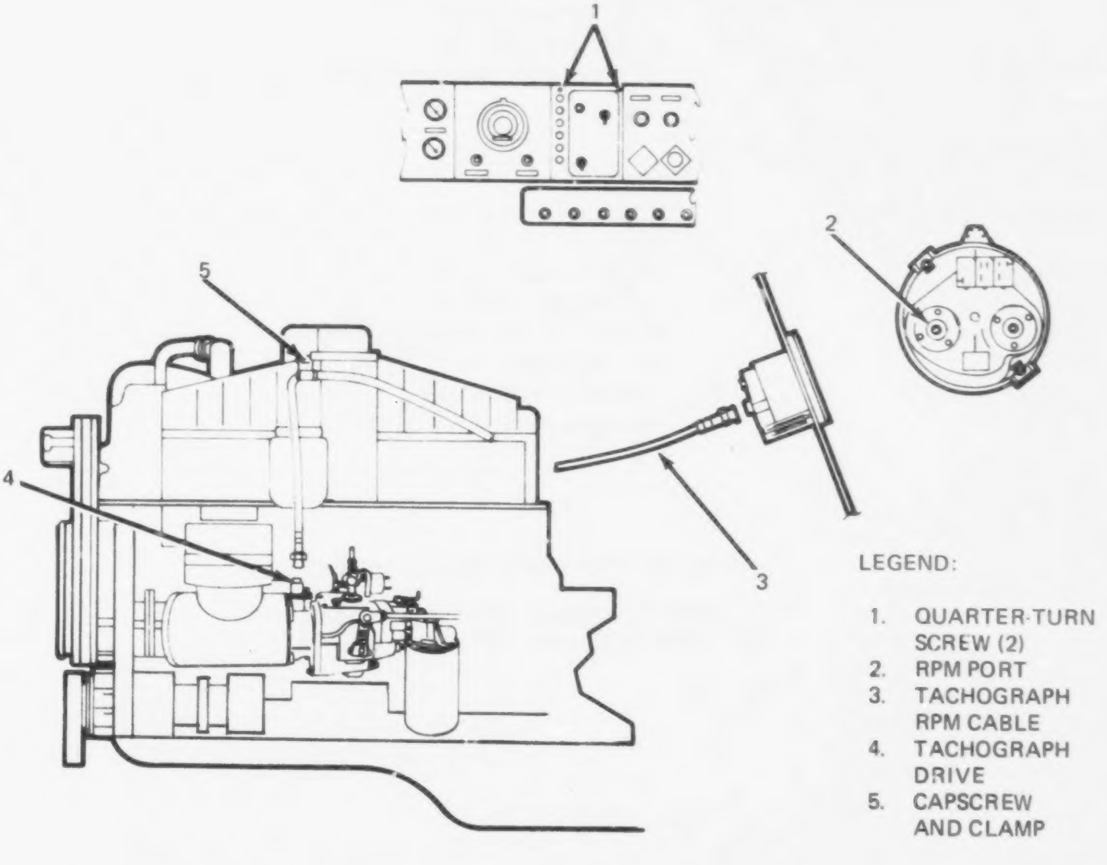
4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

WARNING

Do not work behind dash panel until batteries are disconnected.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two quarter-turn screws (1).	Loosen. Lower panel.	
2. Tachograph RPM cable (3).	a. Disconnect from RPM port (2) of tachograph. b. Remove capscrew and clamp (5).	Closest cable to the lowered panel. Tachograph RPM cable may be tied to the heater water control valve cable; if so remove tie.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LEGEND:
1. QUARTER-TURN SCREW (2)
2. RPM PORT
3. TACHOGRAPH RPM CABLE
4. TACHOGRAPH DRIVE
5. CAPSCREW AND CLAMP

TA 074620

4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
	c. Unscrew from tachograph drive (4) on fuel pump. d. Pull through firewall and remove.	
B. INSTALLATION.		
3. Tachograph RPM cable (3).	a. Screw into tachograph drive (4) on fuel pump. b. Thread free end through firewall. c. Install capscrew and clamp (5). d. Connect to "RPM" port (2) of tachograph. e. Replace cable tie.	Avoid bending the cable sharply. For proper operation, cable should be as straight as possible.
4. Two quarter-turn screws (1).	Close panel; tighten screws.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM9-2320-273-10).	
6. Tachometer.	Check for appropriate reading (580-620 rpm if engine is idling normally) and responsiveness to changes in engine speed.	
7. Engine.	Shut down (see TM 9-2320-273-10).	

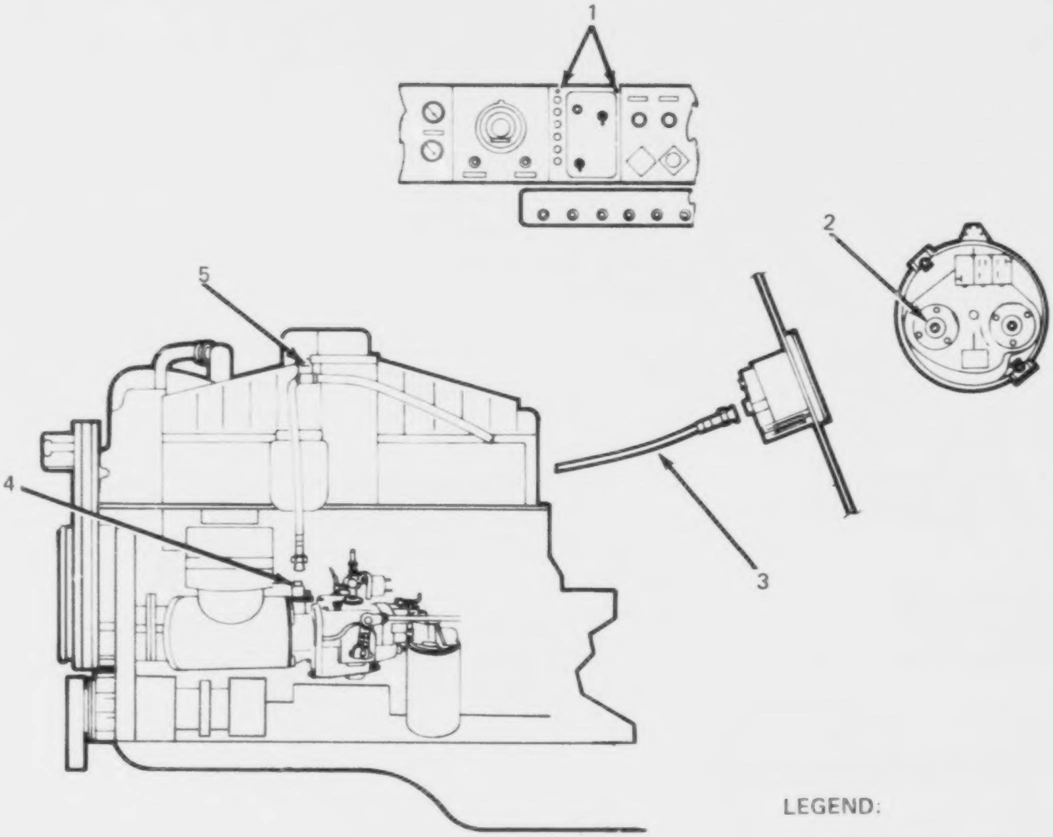
NOTE

Follow-on maintenance action required:

a. Connect batteries; refer to para 5-37B.
b. Install left fender; refer to para 11-14.

4-19. TACHOGRAPH RPM CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (2)
2. RPM PORT
3. TACHOGRAPH RPM CABLE
4. TACHOGRAPH DRIVE
5. CAPSCREW AND CLAMP

TA 074621

FUEL AND AIR INTAKE SYSTEM.

4-20. LINES, HOSES AND FITTINGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (see Appendix C).
Soap Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.
TM9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work in Well Ventilated Area.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

4-20. LINES, HOSES, AND FITTINGS MAINTENANCE (Continued).

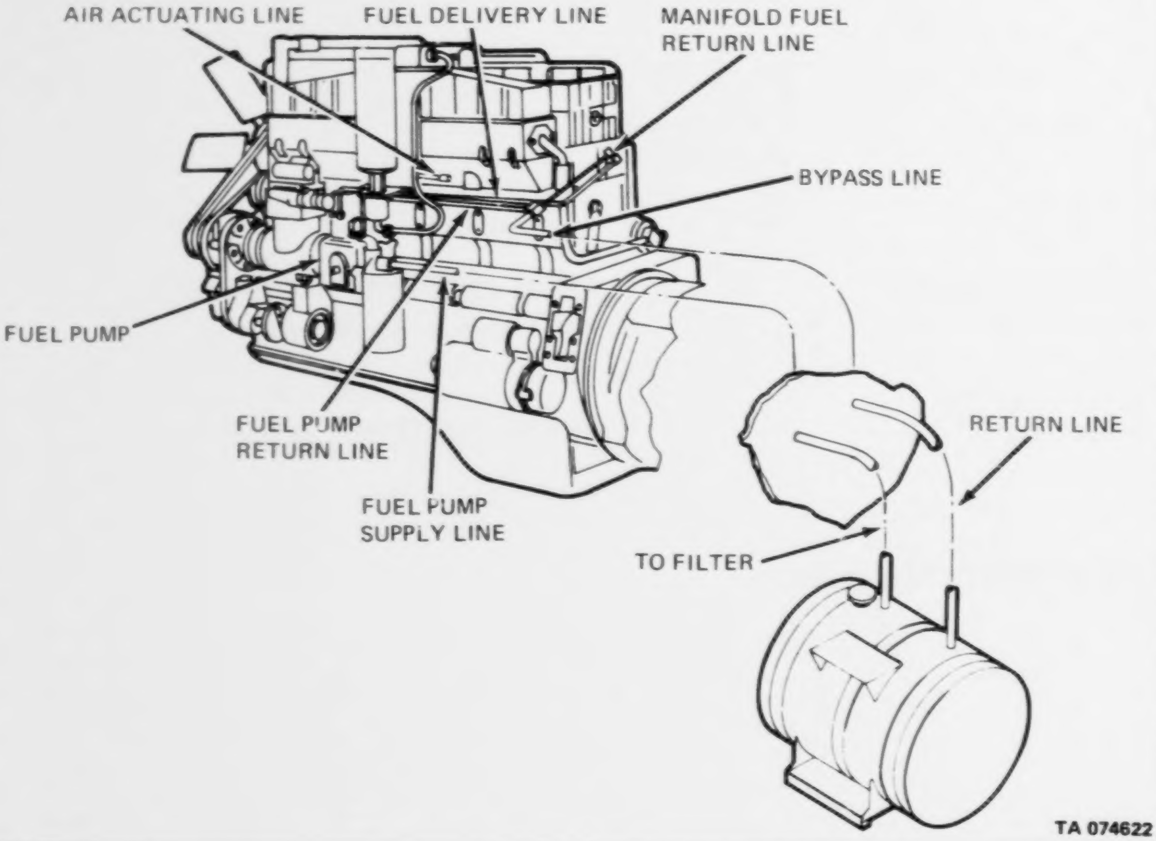
LOCATION/ITEM **ACTION** **REMARKS**

NOTE

The illustration below identifies all exterior lines and hoses of the fuel system. No special instructions or tools are needed if you follow standard shop practice techniques. During installation, observe the following:

1. Line-to-block fittings.	Coat pipes with liquid teflon before insertion.
2. Line-to-line fittings.	Screw together.
3. Air line.	Check for leakage with soap solution.
4. Hose-to-line fittings.	Clamp securely.

After installation, start up engine (see TM9-2320-273-10) and check for leaks.


AIR ACTUATING LINE
FUEL DELIVERY LINE
MANIFOLD FUEL RETURN LINE
BYPASS LINE
FUEL PUMP
FUEL PUMP RETURN LINE
FUEL PUMP SUPPLY LINE
RETURN LINE
TO FILTER
TA 074622

FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(15)
c. Checking Idle Speed.	(3)
	33 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter pin (3), 103362 (24617).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-22A.	Hand Throttle Cable Disconnected at Throttle Mounting Bracket.
12-12A.	Winch Throttle Cable Disconnected at Throttle Mounting Bracket (M916 and M920).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle-Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

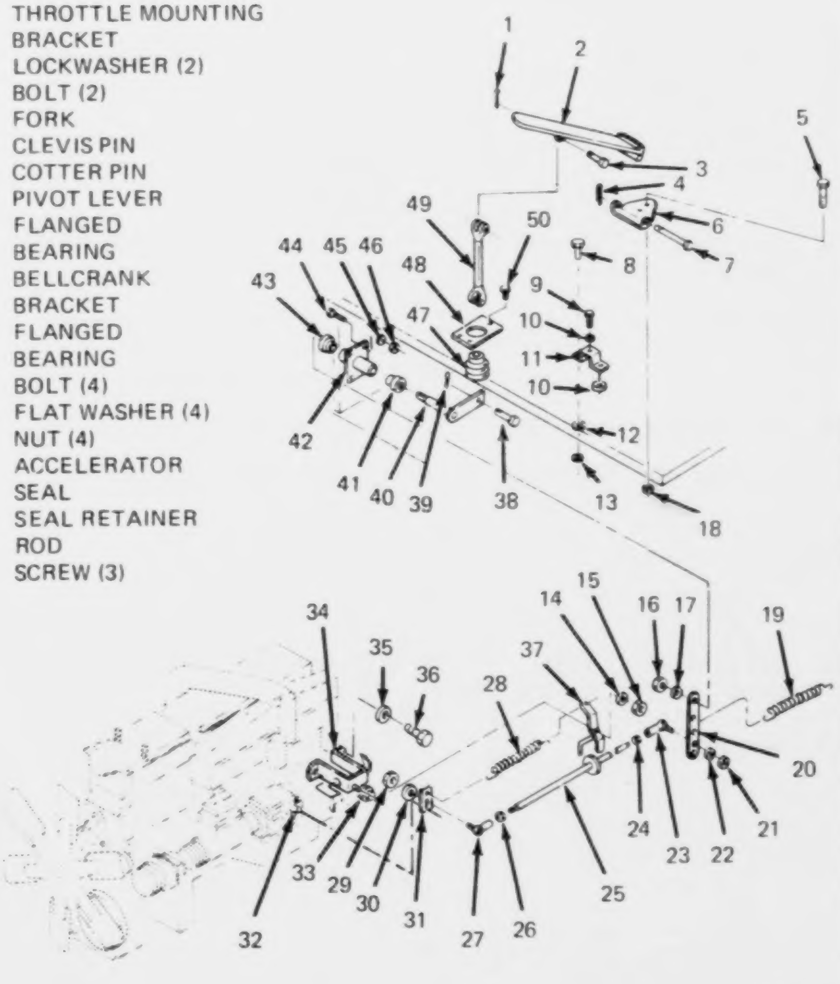
Any time you repair or replace a part in this system, check that idle speed is correct (part C).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Cotter pins (1) and (4).	Remove and pull out clevis pin (3) and straight pin (7); lift out pedal (2).	Discard cotter pins (1) and (4).

LEGEND:

1. COTTER PIN
2. PEDAL
3. CLEVIS PIN
4. COTTER PIN
5. BOLT (2)
6. BRACKET
7. STRAIGHT PIN
8. BOLT (2)
9. BOLT
10. NUT (2)
11. PEDAL STOP BRACKET
12. LOCKWASHER (2)
13. NUT (2)
14. FLAT WASHER
15. LOCKNUT
16. LOCKNUT
17. FLAT WASHER
18. LOCKWASHER AND NUT (2)
19. SPRING
20. LEVER
21. NUT
22. WASHER
23. BALL STUD
24. NUT
25. BELLCRANK ROD
26. NUT
27. BALL STUD
28. SPRING
29. NUT
30. WASHER
31. BRACKET
32. FUEL PUMP LEVER
33. NYLON FLANGED BUSHING
34. THROTTLE MOUNTING BRACKET
35. LOCKWASHER (2)
36. BOLT (2)
37. FORK
38. CLEVIS PIN
39. COTTER PIN
40. PIVOT LEVER
41. FLANGED BEARING
42. BELLCRANK BRACKET
43. FLANGED BEARING
44. BOLT (4)
45. FLAT WASHER (4)
46. NUT (4)
47. ACCELERATOR SEAL
48. SEAL RETAINER
49. ROD
50. SCREW (3)



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4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Two bolts (5), lockwashers and nuts (18).	Unscrew and remove bracket (6).	
3. Two bolts (8), lockwashers (12), and nuts (13).	Unscrew and remove pedal stop bracket (11).	
4. Bolt (9) and two nuts (10).	Unscrew and remove from pedal stop bracket (11).	Count number of threads before disassembly.
5. Three screws (50).	Unscrew and remove seal retainer (48) and accelerator seal (47).	
6. Cotter pin (39).	Remove and pull out clevis pin (38); lift out rod (49).	Discard cotter pin (39).
7. Locknut (16) and flat washer (17).	Unscrew and remove pivot lever (40), flanged bearing (41), and flanged bearing (43).	
8. Four bolts (44), flat washers (45) and nuts (46).	Unscrew and remove bellcrank bracket (42).	
9. Spring (19).	Unhook from lever (20) and attachment point to cab at other end of spring.	
10. Nut (21) and washer (22).	Unscrew and remove lever (20).	
11. Nut (29) and washer (30).	Unscrew from ball stud (27).	Remove items (23 thru (27) as an assembly. Count number of threads before disassembly to maintain idle speed setting.
12. Ball stud (23) and (27) along with nuts (24) and (26).	Unscrew from bellcrank rod (25).	
13. Spring (28).	Unhook from bracket (3) located at fuel pump lever (32), and from throttle mounting bracket (34).	

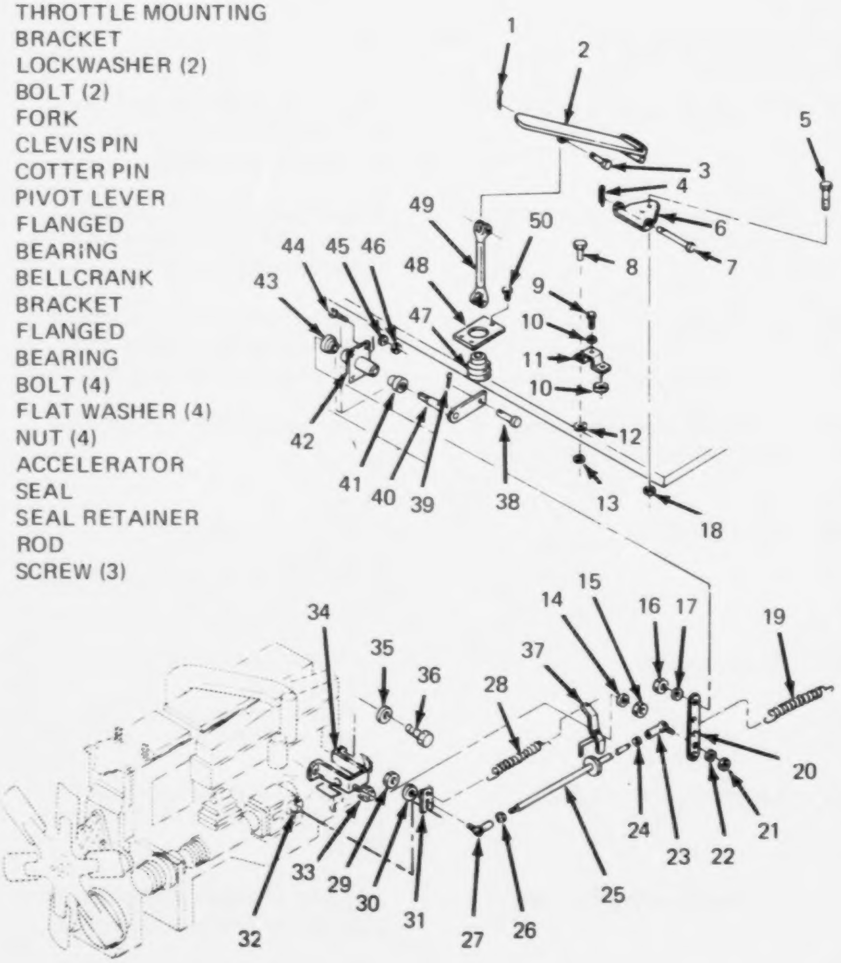
FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. COTTER PIN
2. PEDAL
3. CLEVIS PIN
4. COTTER PIN
5. BOLT (2)
6. BRACKET
7. STRAIGHT PIN
8. BOLT (2)
9. BOLT
10. NUT (2)
11. PEDAL STOP BRACKET
12. LOCKWASHER (2)
13. NUT (2)
14. FLAT WASHER
15. LOCKNUT
16. LOCKNUT
17. FLAT WASHER
18. LOCKWASHER AND NUT (2)
19. SPRING
20. LEVER
21. NUT
22. WASHER
23. BALL STUD
24. NUT
25. BELLCRANK ROD
26. NUT
27. BALL STUD
28. SPRING
29. NUT
30. WASHER
31. BRACKET
32. FUEL PUMP LEVER
33. NYLON FLANGED BUSHING
34. THROTTLE MOUNTING BRACKET
35. LOCKWASHER (2)
36. BOLT (2)
37. FORK
38. CLEVIS PIN
39. COTTER PIN
40. PIVOT LEVER
41. FLANGED BEARING
42. BELLCRANK BRACKET
43. FLANGED BEARING
44. BOLT (4)
45. FLAT WASHER (4)
46. NUT (4)
47. ACCELERATOR SEAL
48. SEAL RETAINER
49. ROD
50. SCREW (3)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4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
14. Locknut (15) and flatwasher (14).	Unscrew and remove fork (37) and nylon flanged bushing (33).	
15. Two bolts (36) and lockwashers (35).	Unscrew and remove throttle mounting bracket (34).	
B. INSTALLATION.		
16. Throttle mounting bracket (34).	Position against side of engine and install with two bolts (36) and lockwashers (35).	
17. Nylon flanged bushing (33) and fork (37).	Attach to throttle mounting bracket (34) with flat washer (14) and locknut (15).	
18. Spring (28).	Hook to bracket (31), located at fuel pump lever (32), and to throttle mounting bracket (34).	
19. Nuts (24) and (26) along with ball stud (23) and (27).	Screw onto bellcrank rod (25).	Screw on the same number of threads you counted in step A 11.
20. Ball stud (27).	a. Insert threaded end thru bracket (31). b. Attach with washer (30) and nut (29).	
21. Ball stud (23).	a. Insert threaded end thru lever (20). b. Attach with washer (22) and nut (21).	
22. Bellcrank bracket (42).	Attach to cab with four bolts (44), flat washers (45) and nuts (46).	
23. Flanged bearing (41) and (43).	Position in either end of guide tube in bellcrank bracket (42).	
24. Pivot lever (40).	a. Insert threaded end thru flanged bearing (41), bellcrank bracket (42), flanged bearing (43) and lever (20). b. Secure with flat washer (17) and locknut (16).	

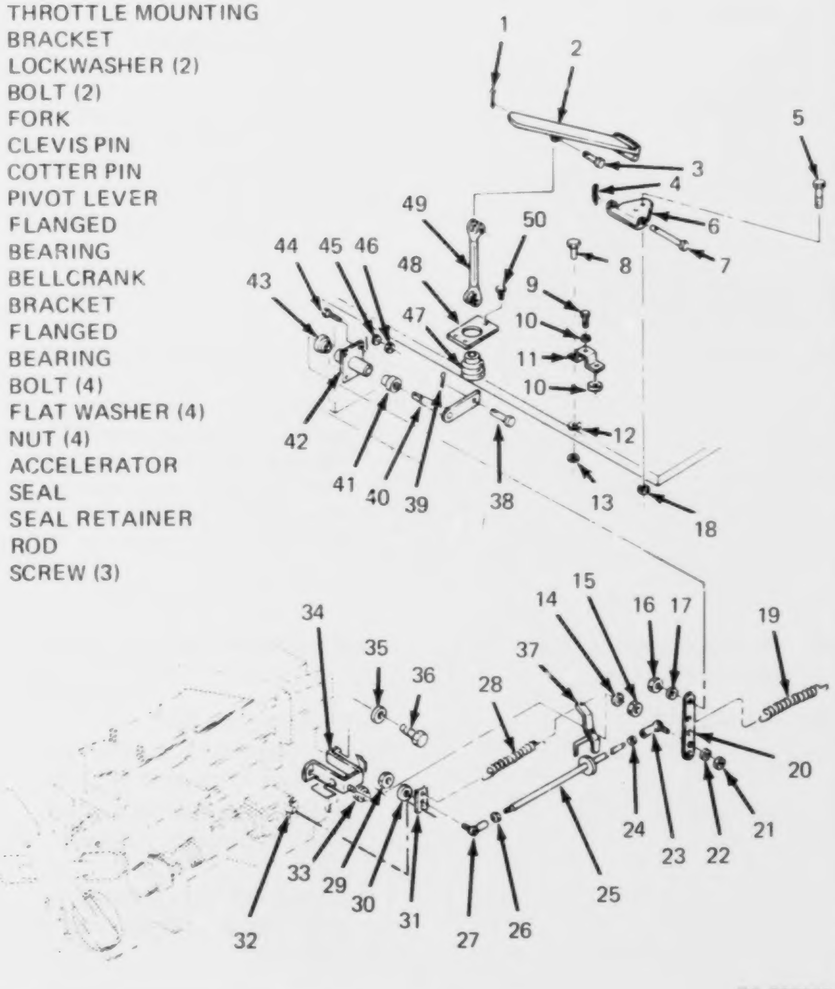
FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
25. Spring (19).	Hook to lever (20) and cab attachment point.	
26. Rod (49).	a. Insert up thru cab floor opening until mounting hole alines with that in pivot lever (40). b. Insert clevis pin (38). c. Secure with new cotter pin (39).	From underneath cab floor.

LEGEND:

1. COTTER PIN
2. PEDAL
3. CLEVIS PIN
4. COTTER PIN
5. BOLT (2)
6. BRACKET
7. STRAIGHT PIN
8. BOLT (2)
9. BOLT
10. NUT (2)
11. PEDAL STOP BRACKET
12. LOCKWASHER (2)
13. NUT (2)
14. FLAT WASHER
15. LOCKNUT
16. LOCKNUT
17. FLAT WASHER
18. LOCKWASHER AND NUT (2)
19. SPRING
20. LEVER
21. NUT
22. WASHER
23. BALL STUD
24. NUT
25. BELLCRANK ROD
26. NUT
27. BALL STUD
28. SPRING
29. NUT
30. WASHER
31. BRACKET
32. FUEL PUMP LEVER
33. NYLON FLANGED BUSHING
34. THROTTLE MOUNTING BRACKET
35. LOCKWASHER (2)
36. BOLT (2)
37. FORK
38. CLEVIS PIN
39. COTTER PIN
40. PIVOT LEVER
41. FLANGED BEARING
42. BELLCRANK BRACKET
43. FLANGED BEARING
44. BOLT (4)
45. FLAT WASHER (4)
46. NUT (4)
47. ACCELERATOR SEAL
48. SEAL RETAINER
49. ROD
50. SCREW (3)



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FUEL AND AIR INTAKE SYSTEM.

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

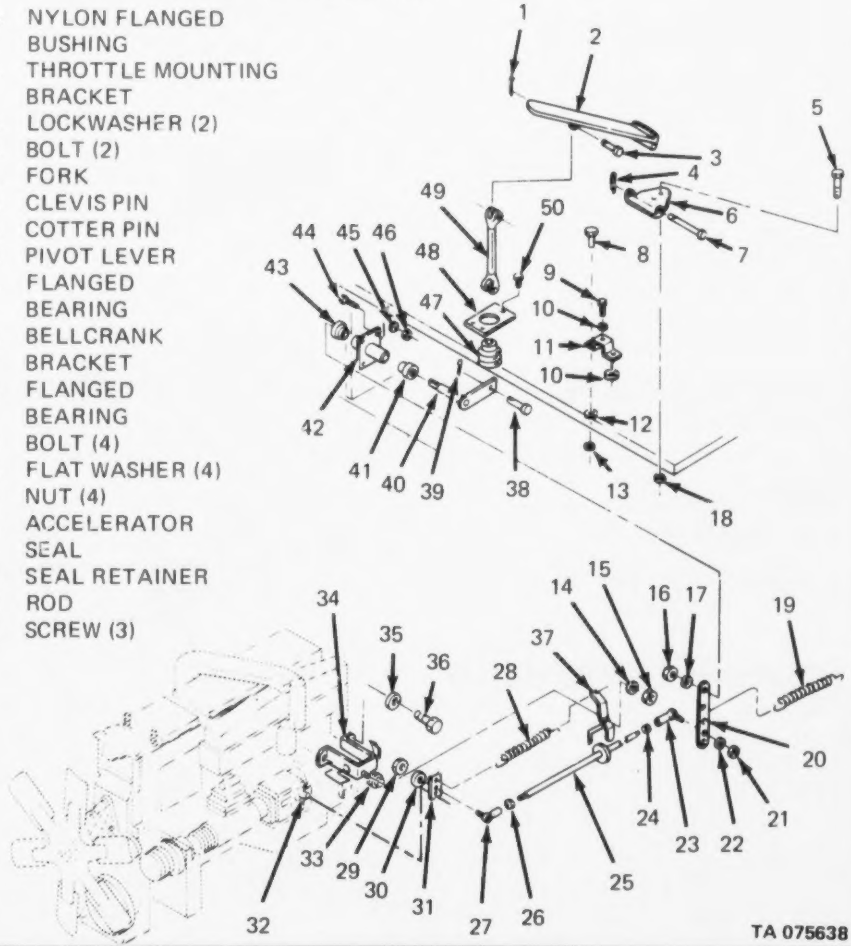
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
27. Accelerator seal (47) and and seal retainer (48).	Slide over rod (49) and secure to cab floor with three screws (50).	From inside cab.
28. Bolt (9) and two nuts (10).	Install thru pedal stop bracket (11).	Screw nuts (10) onto bolt (9) the same number of threads you counted in step A. 4.
29. Pedal stop bracket (11).	Attach to cab floor with two bolts (8), lockwashers (12) and nuts (13).	
30. Bracket (6).	Install to cab floor with two bolts (5), lockwashers and nuts (18).	
31. Pedal (2).	a. Install to bracket (6) with straight pin (7) and new cotter pin (4). b. Install to rod (49) with clevis pin (3) and new cotter pin (1).	
C. CHECKING IDLE SPEED.		
32. Engine.	a. Start up (see TM 9-2320-273-20). b. With engine warmed to normal operating temperature, check to see that tachometer reads 580-620 rpm with your foot off the accelerator pedal. c. Shut down.	If idle speed was below 580 rpm or above 620 rpm proceed to step 33.
33. Nut (29), washer (30) and bracket (31).	Unscrew from ball stud (27).	
34. Ball stud (27).	a. Loosen nut (26). b. Turn counterclockwise to increase idle speed or clockwise to decrease idle speed. c. Lock in position with nut (26). d. Reconnect to bracket (31) with washer (30) and nut (29).	

4-21. ACCELERATOR PEDAL AND ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. CHECKING IDLE SPEED (Continued).		
35. Engine.	a. Start up (see TM 9-2320-273-10). b. Verify that idle speed is within the correct rpm range.	Readjust as necessary.
	Follow on maintenance required: a. Reconnect hand throttle cable at throttle mounting bracket; refer to para 4-22C. b. Reconnect winch throttle cable at throttle mounting bracket; refer to para 12-12C. (M916 and M920 only).	

LEGEND:

1. COTTER PIN
2. PEDAL
3. CLEVIS PIN
4. COTTER PIN
5. BOLT (2)
6. BRACKET
7. STRAIGHT PIN
8. BOLT (2)
9. BOLT
10. NUT (2)
11. PEDAL STOP BRACKET
12. LOCKWASHER (2)
13. NUT (2)
14. FLAT WASHER
15. LOCKNUT
16. LOCKNUT
17. FLAT WASHER
18. LOCKWASHER AND NUT (2)
19. SPRING
20. LEVER
21. NUT
22. WASHER
23. BALL STUD
24. NUT
25. BELLCRANK ROD
26. NUT
27. BALL STUD
28. SPRING
29. NUT
30. WASHER
31. BRACKET
32. FUEL PUMP LEVER
33. NYLON FLANGED BUSHING
34. THROTTLE MOUNTING BRACKET
35. LOCKWASHER (2)
36. BOLT (2)
37. FORK
38. CLEVIS PIN
39. COTTER PIN
40. PIVOT LEVER
41. FLANGED BEARING
42. BELLCRANK BRACKET
43. FLANGED BEARING
44. BOLT (4)
45. FLAT WASHER (4)
46. NUT (4)
47. ACCELERATOR SEAL
48. SEAL RETAINER
49. ROD
50. SCREW (3)



4-22. HAND THROTTLE LINKAGE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Cleaning and Inspection.	(5)
c. Installation.	(30)
d. Checking Idle Speed.	(2)
	57 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle on Level Ground.

GENERAL SAFETY INSTRUCTIONS

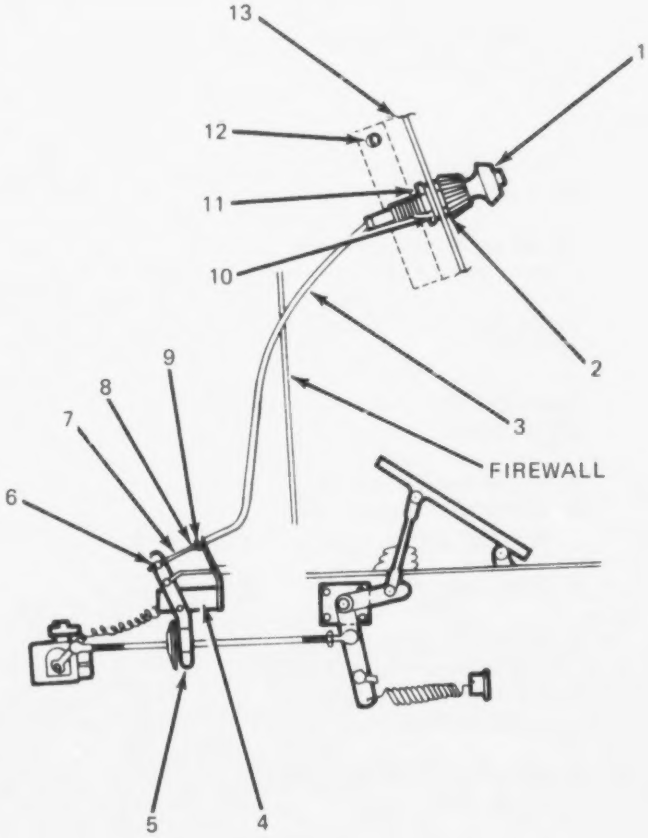
Engine Off; Transmission in Neutral.
Park Brake Set.

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Setscrew (6).	Unscrew and remove from pivot lever (5).	
2. Two locknuts (8) and washers (9).	Unscrew and remove.	
3. Hand throttle cable (3).	Pull through bracket (4).	
4. Two screws (12).	a. Remove from heater control panel (13). b. Remove back of heater control panel (13).	Screws are located on each end.



LEGEND:

1. THROTTLE KNOB
2. LOCKNUT
3. HAND THROTTLE CABLE
4. BRACKET
5. PIVOT LEVER
6. SET SCREW
7. CABLE WIRE
8. LOCKNUT (2)
9. WASHER (2)
10. STAR WASHER
11. LOCKNUT
12. SCREW (2)
13. HEATER CONTROL PANEL

TA 074625

FUEL AND AIR INTAKE SYSTEM.

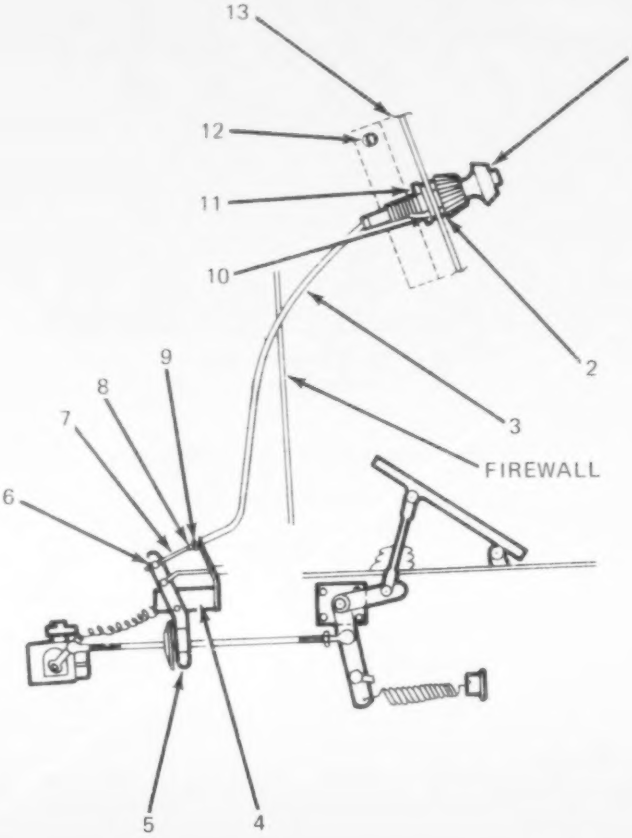
4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Locknut (11) and starwasher (10).	Unscrew and remove from hand throttle cable (3).	
6. Hand throttle cable (3).	Pull from firewall and heater control panel (13).	
7. Locknut (2).	Unscrew and remove from hand throttle cable (3).	
B. CLEANING AND INSPECTION.		
8. Hand throttle cable (3).	Wipe clean and inspect for: a. Kinked cable. b. Cable end crossed or burred threads.	Replace as necessary.
C. INSTALLATION.		
9. Locknut (2).	Screw onto hand throttle cable (3).	
10. Hand throttle cable (3).	Install thru front of heater control panel (13).	
11. Locknut (11) and starwasher (10).	Screw onto hand throttle cable (3).	
12. Hand throttle cable (3).	Insert end thru firewall and bracket.	
13. Heater control panel (13).	a. Install back of panel. b. Install two screws (12) and tighten.	
14. Two locknuts (8) and washers (9).	a. Install and tighten. b. It may be necessary to either loosen or tighten the locknut (8) on the outer bracket face.	
15. Setscrew (6).	Install and tighten to lock cable wire (7).	
16. Throttle knob (1).	Remove and lubricate hand throttle cable (3) per LO 9-2320-273-12.	

FUEL AND AIR INTAKE SYSTEM.

4-22. HAND THROTTLE LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING IDLE SPEED.		
17. Engine.	a. Start up (see TM 9-2320-273-10). b. With engine warmed up check that: (1) Engine idles at 580-620 rpm when throttle knob (1) is pushed completely in. (2) Idle speed increases as soon as you begin to pull out on throttle knob (1). (Turning knob counterclockwise will also increase rpm.)	



LEGEND:

1. THROTTLE KNOB
2. LOCKNUT
3. HAND THROTTLE CABLE
4. BRACKET
5. PIVOT LEVER
6. SET SCREW
7. CABLE WIRE
8. LOCKNUT (2)
9. WASHER (2)
10. STAR WASHER
11. LOCKNUT
12. SCREW (2)
13. HEATER CONTROL PANEL

TA 074826

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(35)
b. Installation.	(40)
c. Checking for Leaks.	(5)
	80 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

SD-2 Dry Cleaning Solvent (Refer to Appendix C).
Containers for Fuel (AR).
Masking Tape.
Marking Pencil.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Three (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Work in Well Ventilated Area.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

FUEL AND AIR INTAKE SYSTEM.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

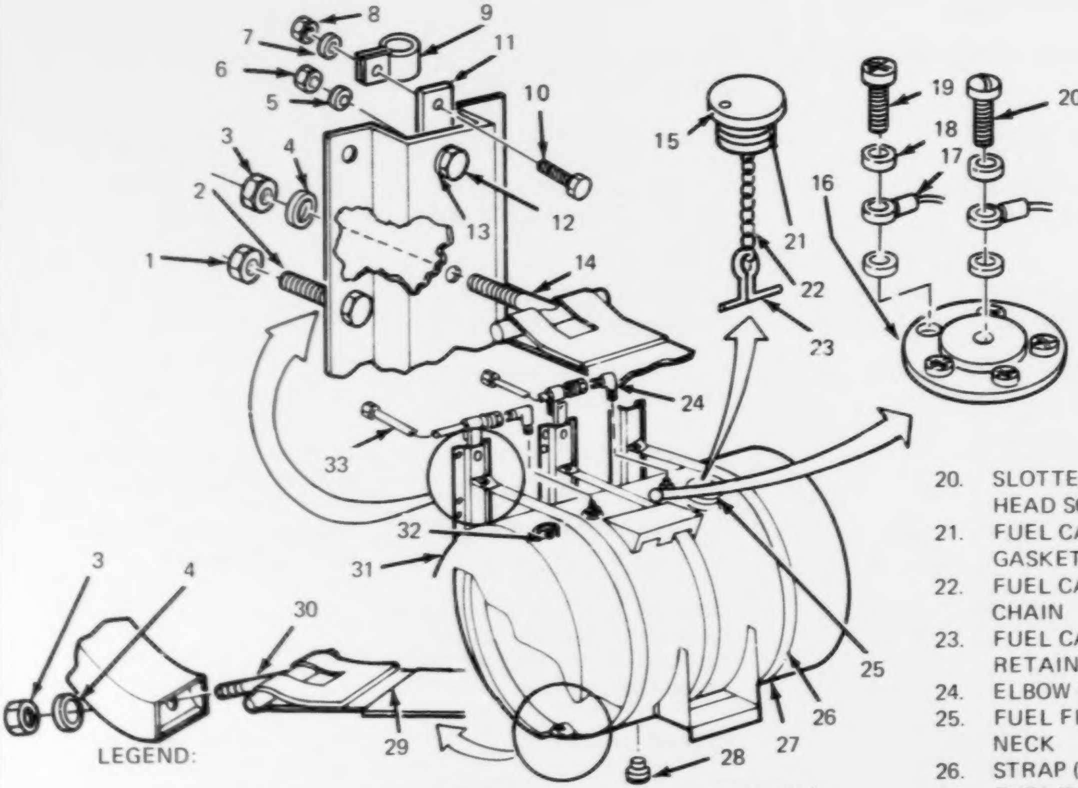
CAUTION

Be sure that tank is supported so that it will not fall when straps (26) are removed.

A. REMOVAL.

NOTE

Place container under drain plug (28) to catch fuel.



LEGEND:

1. NUT (12)
2. BOLT (12)
3. NUT (6)
4. LOCKWASHER (6)
5. WASHER (2)
6. NUT (2)
7. WASHER (2)
8. NUT (2)
9. HOSE CLAMP (2)
10. BOLT (2)
11. BRACKET (2)
12. BOLT (2)
13. WASHER (2)
14. UPPER T-BOLT (3)
15. FUEL CAP
16. FUEL SENDER FLANGE
17. TERMINAL (2)
18. WASHER (4)
19. PHILLIPS HEAD SCREW
20. SLOTTED HEAD SCREW
21. FUEL CAP GASKET
22. FUEL CAP CHAIN
23. FUEL CAP RETAINER
24. ELBOW (2)
25. FUEL FILL NECK
26. STRAP (3)
27. FUEL TANK
28. DRAIN PLUG
29. INSULATOR (3)
30. LOWER T-BOLT (3)
31. AIR VENT
32. J-BRACKET (3)
33. FUEL LINE (2)

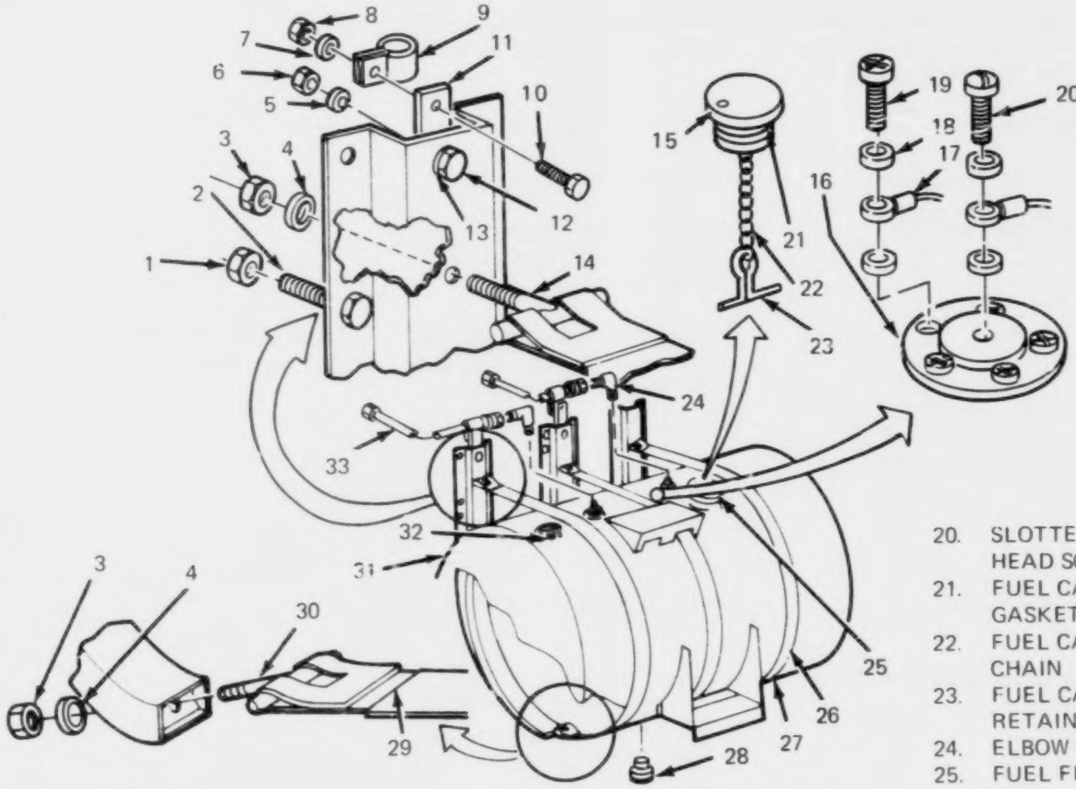
TA 074627

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
1. Drain Plug (28).	a. Remove and allow fuel to drain into container. b. Screw back into tank.	
2. Two fuel lines (33).	Unscrew from two elbows (24).	Mark locations for reassembly.
3. Two elbows (24).	Unscrew and remove from fuel tank (27).	
4. Phillips head screw (19), slotted head screw (20) and four washers (18).	Unscrew and remove two terminals (17).	Mark wire locations for reassembly.
5. Six nuts (3) and lockwashers (4).	Unscrew and remove three straps (26).	
6. Fuel tank (27).	Lower from vehicle to ground.	
7. Two bolts (10), washers (7), and nuts (8).	Unscrew and remove two hose clamps (9) from two brackets (11).	Slide hose clamps (9) off two fuel lines (33).
8. Two bolts (12), washers (13), washers (5), and nuts (6).	Unscrew and remove two brackets (11).	
9. Twelve bolts (2) and nuts (1).	Unscrew and remove three J-brackets (32).	
10. Air vent (31).	Unscrew from fuel tank (27).	Run wire thru vent hole to ensure free air flow.
11. Three insulators (29).	Remove from three straps (26).	Replace if rubber is cracked or deteriorated.
12. Fuel cap (15).	Unscrew and pull out to point where fuel cap retainer (23) catches on fuel filter screen inside tank.	
13. Fuel cap gasket (21) and fuel cap chain (22).	Inspect for damage.	Replace as necessary by unhooking chain from inside of fuel cap (15) and replacing, use needle nose pliers to open chain link.
14. Fuel sender flange (16) with fuel sender attached.	Remove; refer to para 5-79A.	

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. NUT (12)
2. BOLT (12)
3. NUT (6)
4. LOCKWASHER (6)
5. WASHER (2)
6. NUT (2)
7. WASHER (2)
8. NUT (2)
9. HOSE CLAMP (2)
10. BOLT (2)
11. BRACKET (2)
12. BOLT (2)
13. WASHER (2)
14. UPPER T-BOLT (3)
15. FUEL CAP
16. FUEL SENDER FLANGE
17. TERMINAL (2)
18. WASHER (4)
19. PHILLIPS HEAD SCREW
20. SLOTTED HEAD SCREW
21. FUEL CAP GASKET
22. FUEL CAP CHAIN
23. FUEL CAP RETAINER
24. ELBOW (2)
25. FUEL FILL NECK
26. STRAP (3)
27. FUEL TANK
28. DRAIN PLUG
29. INSULATOR (3)
30. LOWER T-BOLT (3)
31. AIR VENT
32. J-BRACKET (3)
33. FUEL LINE (2)

TA 074628

FUEL AND AIR INTAKE SYSTEM.

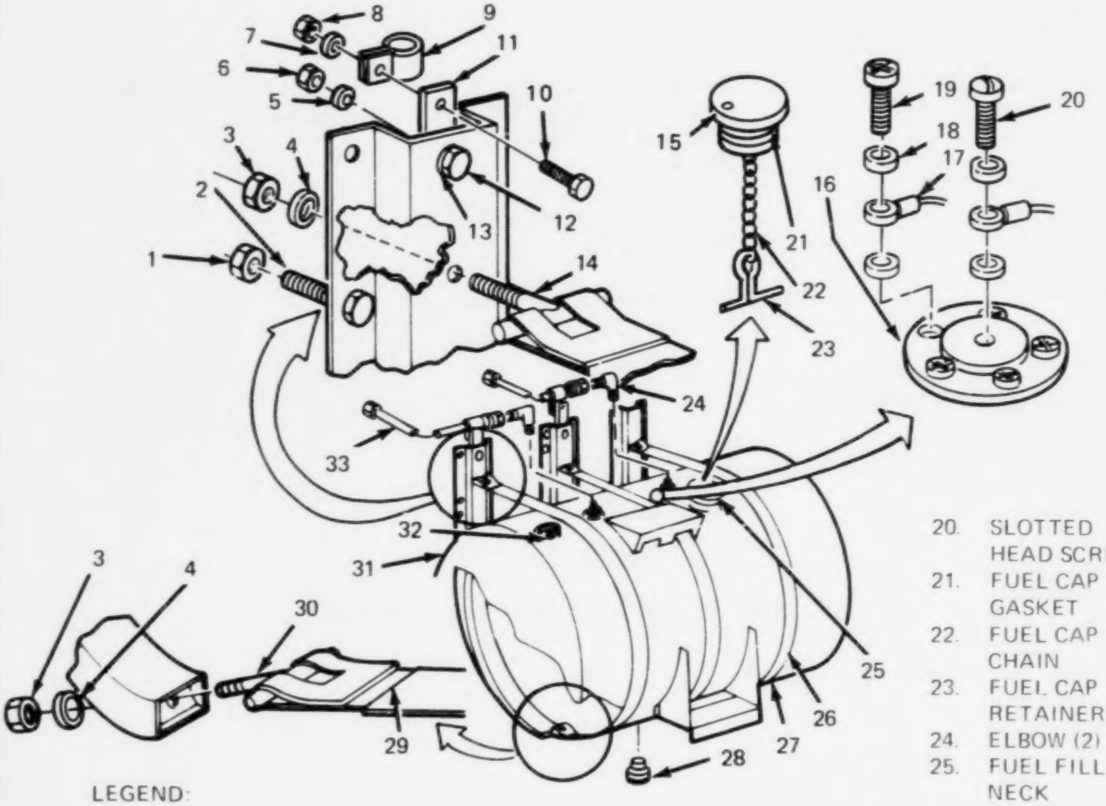
4-23. FUEL TANK MAINTENANCE (Continued).

B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
15. Fuel sender flange (16) with fuel sender attached.	Install; refer to para 5-79B.	
16. Fuel cap (15) with fuel cap gasket (21), fuel cap chain (22), and fuel cap retainer (23).	Position on fuel fill neck (25) and screw fuel cap (15) on.	
17. Three insulators (29).	Install on three straps (26).	
18. Air vent (31).	Screw into fuel tank (27).	
19. Three J-brackets (32).	Aline mounting holes to frame and install with twelve bolts (2) and nuts (1).	
20. Two brackets (11).	Install to two J-brackets (32) with two bolts (12), washers (13), washers (5), and nuts (6).	Install to the two forward most J-brackets.
21. Two hose clamps (9).	a. Slide over two fuel lines (33). b. Secure to two brackets (11) with two bolts (10), washers (7) and nuts (8).	
22. Fuel tank (27).	Raise into position against three J-brackets (26).	
23. Three straps (26) with three insulators (29).	a. Insert three lower T-bolts (30) thru bottom of three J-brackets (32) and secure with three lockwashers (4) and nuts (3). b. Insert three upper T-bolts (14) thru top center hole of three J-brackets (32) and secure with three lockwashers (4) and nuts (3).	
24. Two terminals (17).	Position on fuel sender flange (16) and install with phillips head screw (19), slotted head screw (20) and four washers (18).	Install as you marked at disassembly.
25. Two elbows (24).	a. Apply liquid teflon to threads. b. Screw into fuel tank (27).	

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. NUT (12)
2. BOLT (12)
3. NUT (6)
4. LOCKWASHER (6)
5. WASHER (2)
6. NUT (2)
7. WASHER (2)
8. NUT (2)
9. HOSE CLAMP (2)
10. BOLT (2)
11. BRACKET (2)
12. BOLT (2)
13. WASHER (2)
14. UPPER T-BOLT (3)
15. FUEL CAP
16. FUEL SENDER FLANGE
17. TERMINAL (2)
18. WASHER (4)
19. PHILLIPS HEAD SCREW
20. SLOTTED HEAD SCREW
21. FUEL CAP GASKET
22. FUEL CAP CHAIN
23. FUEL CAP RETAINER
24. ELBOW (2)
25. FUEL FILL NECK
26. STRAP (3)
27. FUEL TANK
28. DRAIN PLUG
29. INSULATOR (3)
30. LOWER T-BOLT (3)
31. AIR VENT
32. J-BRACKET (3)
33. FUEL LINE (2)

TA 075639

4-23. FUEL TANK MAINTENANCE (Continued).

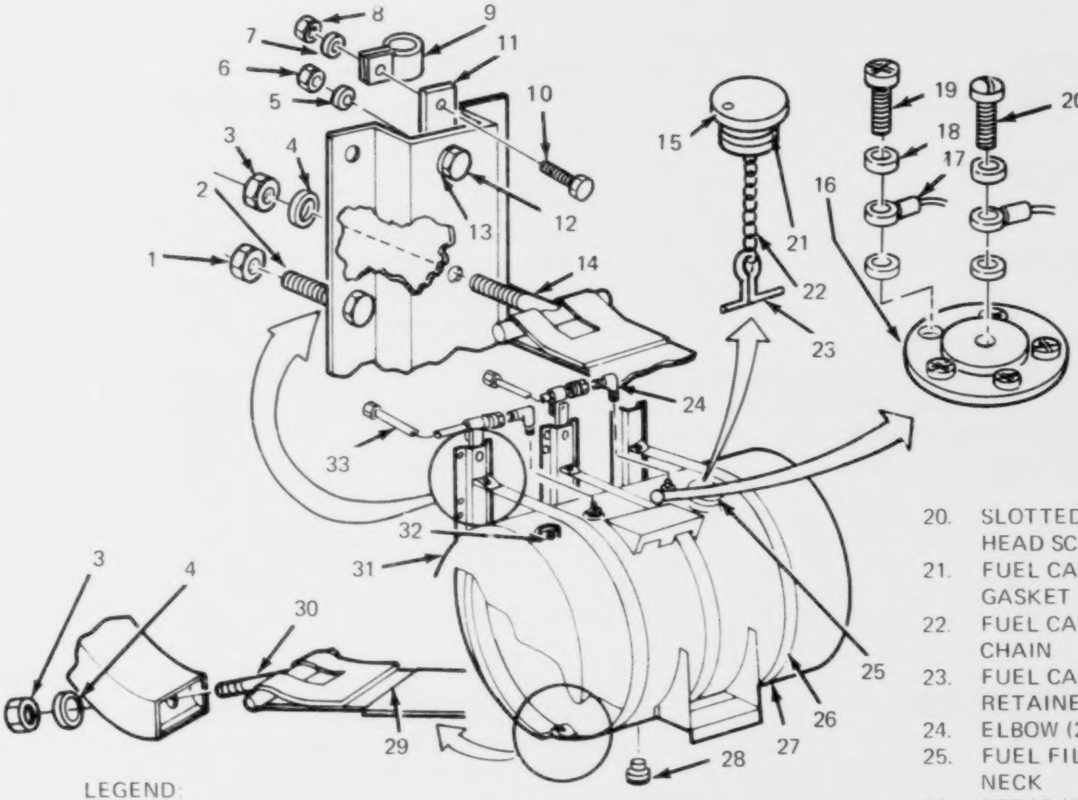
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
26. Two fuel lines (33).	Screw onto two elbows (24).	Install as you marked at disassembly.
C. CHECKING FOR LEAKS.		
27. Fuel fill neck (25).	Remove fuel cap (15) from fuel fill neck (25). Fill tank with fuel (see TM 9-2320-273-10).	Be sure drain plug (28) is tightened.
28. Fuel cap (15).	Put on and tighten to fuel fill neck (25).	
29. Engine.	Start up (see TM 9-2320-273-10).	
30. Fuel tank (27), two fuel lines (33), and two elbows (24).	Check for leaks.	Retighten as necessary.
31. Engine.	Shut down (see TM 9-2320-273-10).	

NOTE

For other fuel line locations refer to para 4-20.

4-23. FUEL TANK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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TA 075640

LEGEND:

1. NUT (12)
2. BOLT (12)
3. NUT (6)
4. LOCKWASHER (6)
5. WASHER (2)
6. NUT (2)
7. WASHER (2)
8. NUT (2)
9. HOSE CLAMP (2)
10. BOLT (2)
11. BRACKET (2)
12. BOLT (2)
13. WASHER (2)
14. UPPER T-BOLT (3)
15. FUEL CAP
16. FUEL SENDER FLANGE
17. TERMINAL (2)
18. WASHER (4)
19. PHILLIPS HEAD SCREW
20. SLOTTED HEAD SCREW
21. FUEL CAP GASKET
22. FUEL CAP CHAIN
23. FUEL CAP RETAINER
24. ELBOW (2)
25. FUEL FILL NECK
26. STRAP (3)
27. FUEL TANK
28. DRAIN PLUG
29. INSULATOR (3)
30. LOWER T-BOLT (3)
31. AIR VENT
32. J-BRACKET (3)
33. FUEL LINE (2)

FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Cleaning.	(15)
c. Installation.	(15)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Inner Filter Element (If Outside Filter Has Been Cleaned Five Times.) (250C127).
Outer Filter Element (250C128).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Darkened Area for Element Check.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).

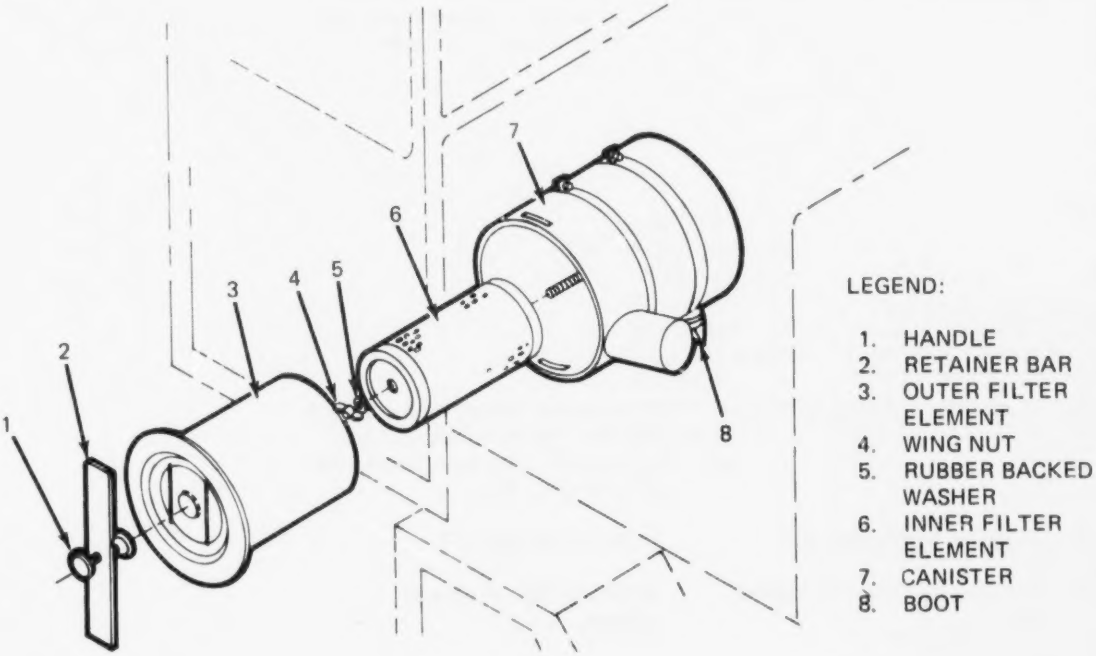
A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Handle (1) and retainer bar (2).	Unscrew handle, slide bar out of slots and remove.	
2. Outer filter element (3).	Grasp bands on face and pull out of canister (7).	

CAUTION

Do not clean inner element. Do not remove unless to replace with a new element. This should be done after the outside filter has been cleaned five times.

LOCATION/ITEM	ACTION	REMARKS
3. Inner filter element (6).	Remove if necessary, by unscrewing wing nut (4) and removing rubber backed washer (5).	Rubber seal at opposite end may stick making removal difficult. Grasp end and work back and forth to free.


7
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8
LEGEND:
1. HANDLE
2. RETAINER BAR
3. OUTER FILTER ELEMENT
4. WING NUT
5. RUBBER BACKED WASHER
6. INNER FILTER ELEMENT
7. CANISTER
8. BOOT

TA 074629

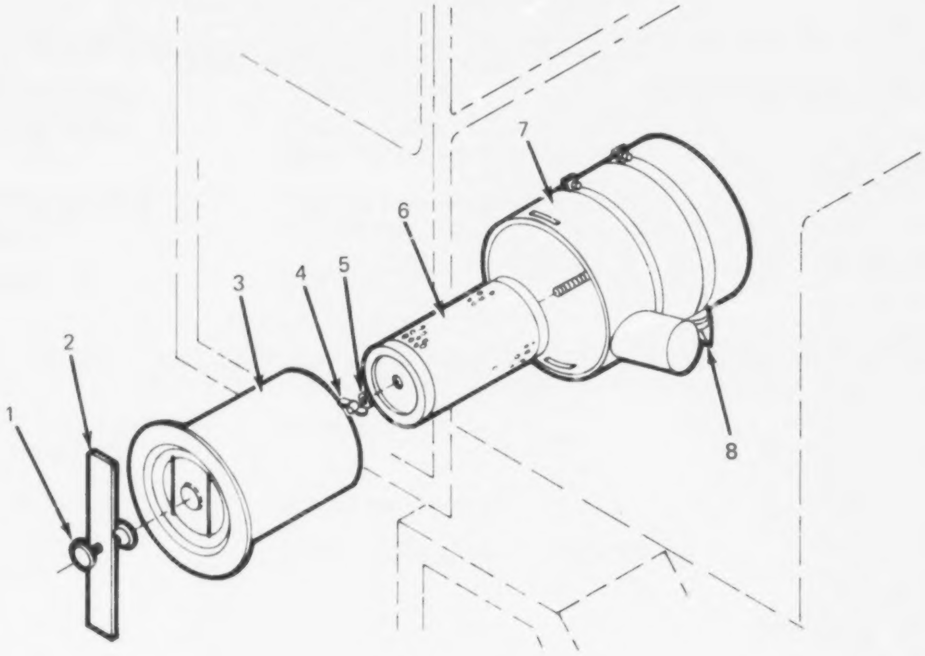
FUEL AND AIR INTAKE SYSTEM.

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
	WARNING Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).	
B. CLEANING.		
4. Outer filter element (3).	a. Tap element to shake dust loose.	
	b. Insert compressor air nozzle into element to blow out dust.	Pressure should not exceed 30 psi.
	c. Wash in water with mild non-sudsing detergent. Rinse gently with clean water and allow to air dry. (Replace after five washings.)	Skip this step if filter seems clean and after steps a and b.
	d. Shine light inside element. Watch outside for light shining through leaks.	If element is damaged, replace.
5. Canister (7).	a. Squeeze boot (8) together to release trapped dust.	
	b. Wipe inside of canister (7) clean.	
C. INSTALLATION.		
6. Inner filter element (6).	If removed, install new element by positioning rubber backed washer (5) over stud and screw on wing nut (4).	
7. Outer filter element (3).	Place in canister (7).	
8. Retainer bar (2), and handle (1).	Slide through slots and tighten.	

4-24. AIR CLEANER ELEMENT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. HANDLE
2. RETAINER BAR
3. OUTER FILTER ELEMENT
4. WING NUT
5. RUBBER BACKED WASHER
6. INNER FILTER ELEMENT
7. CANISTER
8. BOOT

TA 074630

4-25. AIR CLEANER ASSEMBLY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Filter Assembly.	(5)
b. Removal of Brackets and Fittings.	(5)
c. Installation of Brackets and Fittings.	(5)
d. Installation of Filter Assembly.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63820).

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

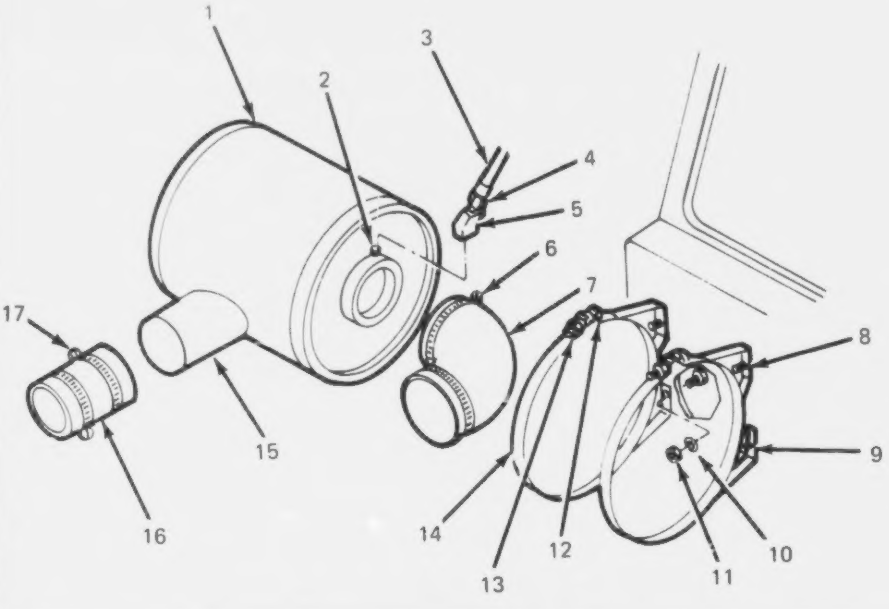
GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral.
Park Brake Set.

FUEL AND AIR INTAKE SYSTEM.

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF FILTER ASSEMBLY.		
1. Turbo air inlet pipe (7).	Loosen clamp (6) at filter discharge and remove inlet pipe.	
2. Restriction indicator tube (3).	Disconnect flare nut (4) from elbow (5).	
3. Air intake pipe (15).	Loosen clamps (17) and slide boot (16) off air intake pipe (15).	
4. Four nuts (11) and four lockwashers (10).	Remove from three studs (8) and bolt (9).	
5. Filter assembly (1).	Remove.	
B. REMOVAL OF BRACKETS AND FITTINGS (REPLACEMENT OF UNIT ONLY).		
6. Two capscrews (12) and two nuts and lockwashers (13).	Remove.	
7. Two brackets (14).	Spread and remove.	
8. Nipple filter (2).	Remove with elbow (5) attached.	



LEGEND:

1. FILTER ASSEMBLY
2. NIPPLE FILTER
3. RESTRICTION INDICATOR TUBE
4. FLARE NUT
5. ELBOW
6. CLAMP (2)
7. TURBO AIR INLET PIPE
8. STUD (3)
9. BOLT
10. LOCKWASHER (4)
11. NUT (4)
12. CAPSCREW (2)
13. NUT AND LOCKWASHER (2)
14. BRACKET (2)
15. AIR INTAKE PIPE
16. BOOT
17. CLAMP (2)

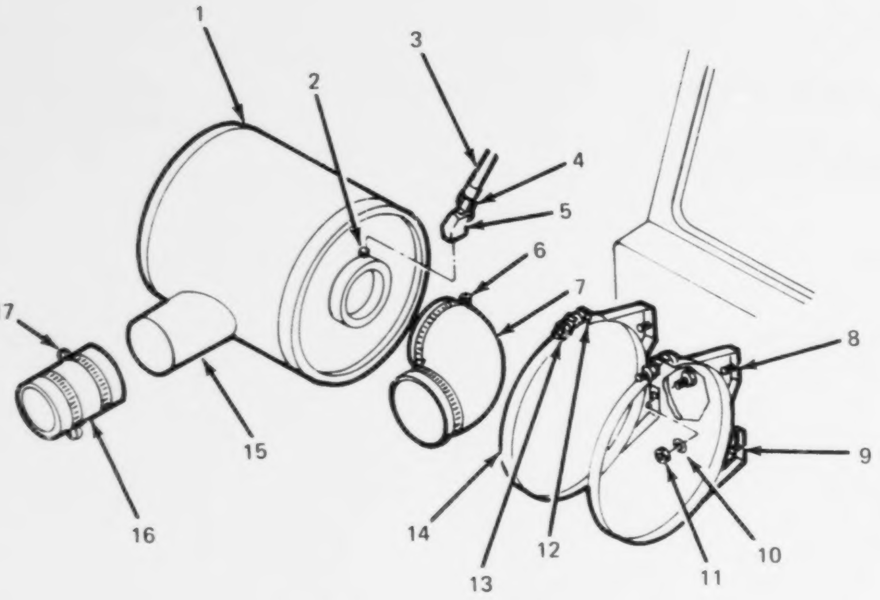
TA 074631

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION OF BRACKETS AND FITTINGS (IF REMOVED).		
9. Nipple filter (2).	Install with elbow (5) attached.	
10. Two brackets (14).	Spread and position on air filter assembly (1).	
11. Two capscrews (12) and two nuts and lockwashers (13).	Install finger tight.	
D. INSTALLATION OF FILTER ASSEMBLY.		
12. Filter assembly (1).	Place on three studs (8), and bolt (9), install four lockwashers (10) and nuts (11).	If brackets are removed it may be necessary to reposition them to fit over studs. Tighten nuts at this time.
13. Air intake pipe (15).	Slide boot (16) over air intake pipe (15) position and tighten two clamps (17).	
14. Restriction indicator tube (3).	Connect flare nut (4) to elbow (5) and tighten.	
15. Turbo air inlet pipe (7).	Install over filter discharge. Position and tighten clamps (6).	

4-25. AIR CLEANER ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FILTER ASSEMBLY
2. NIPPLE FILTER
3. RESTRICTION INDICATOR TUBE
4. FLARE NUT
5. ELBOW
6. CLAMP (2)
7. TURBO AIR INLET PIPE
8. STUD (3)
9. BOLT
10. LOCKWASHER (4)
11. NUT (4)
12. CAPSCREW (2)
13. NUT AND LOCKWASHER (2)
14. BRACKET (2)
15. AIR INTAKE PIPE
16. BOOT
17. CLAMP (2)

TA 074632

FUEL AND AIR INTAKE SYSTEM.

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Indicator.	(2)
b. Installation of Indicator.	(2)
c. Removal of Tube and Filter.	(5)
d. Installation of Tube and Filter.	(6)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

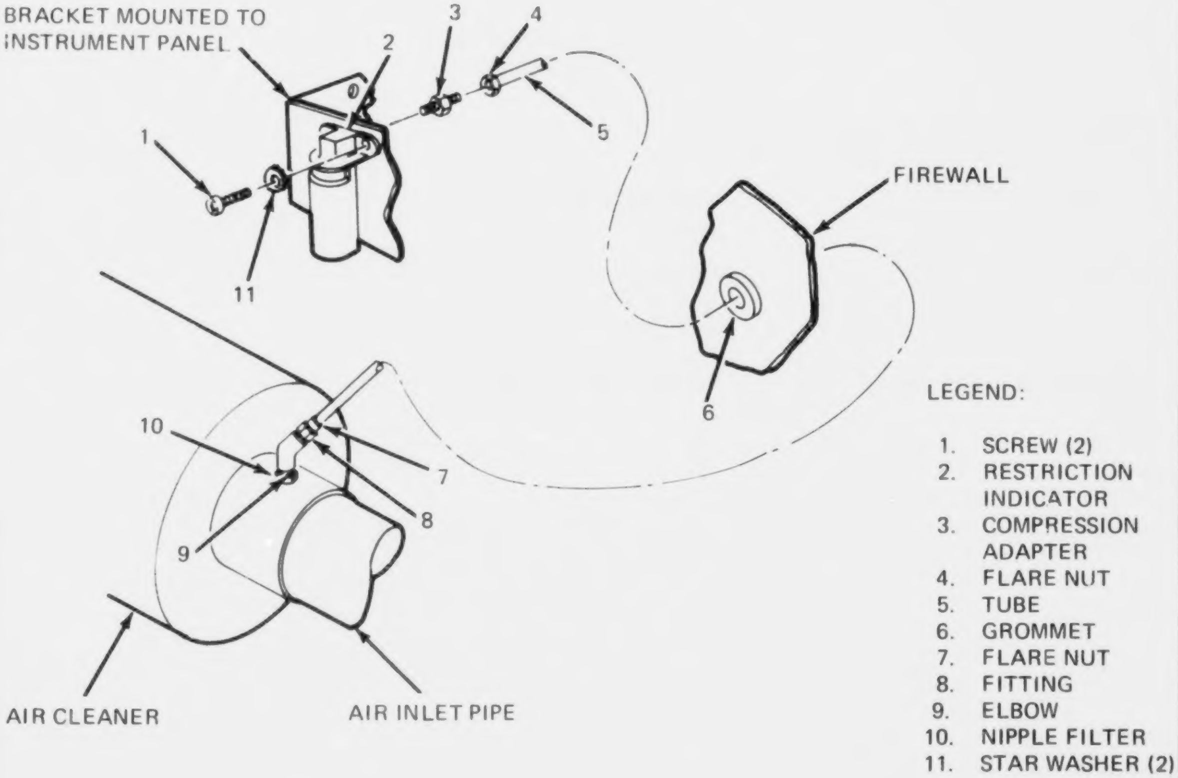
GENERAL SAFETY INSTRUCTIONS

Engine Off; Transmission in Neutral
Park Brake Set.

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).

A. INDICATOR REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Flare nut (4).	Reach behind bracket and unscrew nut from compression adapter (3). Disconnect tube (5).	
2. Two screws (1) and starwashers (11).	Unscrew and remove.	
3. Restriction indicator (2).	Remove.	If replacing indicator remove compression adapter (3).


BRACKET MOUNTED TO INSTRUMENT PANEL
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FIREWALL
6
10
7
8
9
AIR CLEANER
AIR INLET PIPE

LEGEND:

1. SCREW (2)
2. RESTRICTION INDICATOR
3. COMPRESSION ADAPTER
4. FLARE NUT
5. TUBE
6. GROMMET
7. FLARE NUT
8. FITTING
9. ELBOW
10. NIPPLE FILTER
11. STAR WASHER (2)

TA 074633

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INDICATOR INSTALLATION.		
4. Restriction indicator (2).	Position on bracket.	
5. Two screws (1) and starwashers (11).	Screw in and tighten.	If new indicator is being installed screw in and tighten compression adapter (3), into restriction indicator (2).

NOTE

If you plan to remove tube (5) and nipple filter (10), go directly to step 7, if not do step 6.

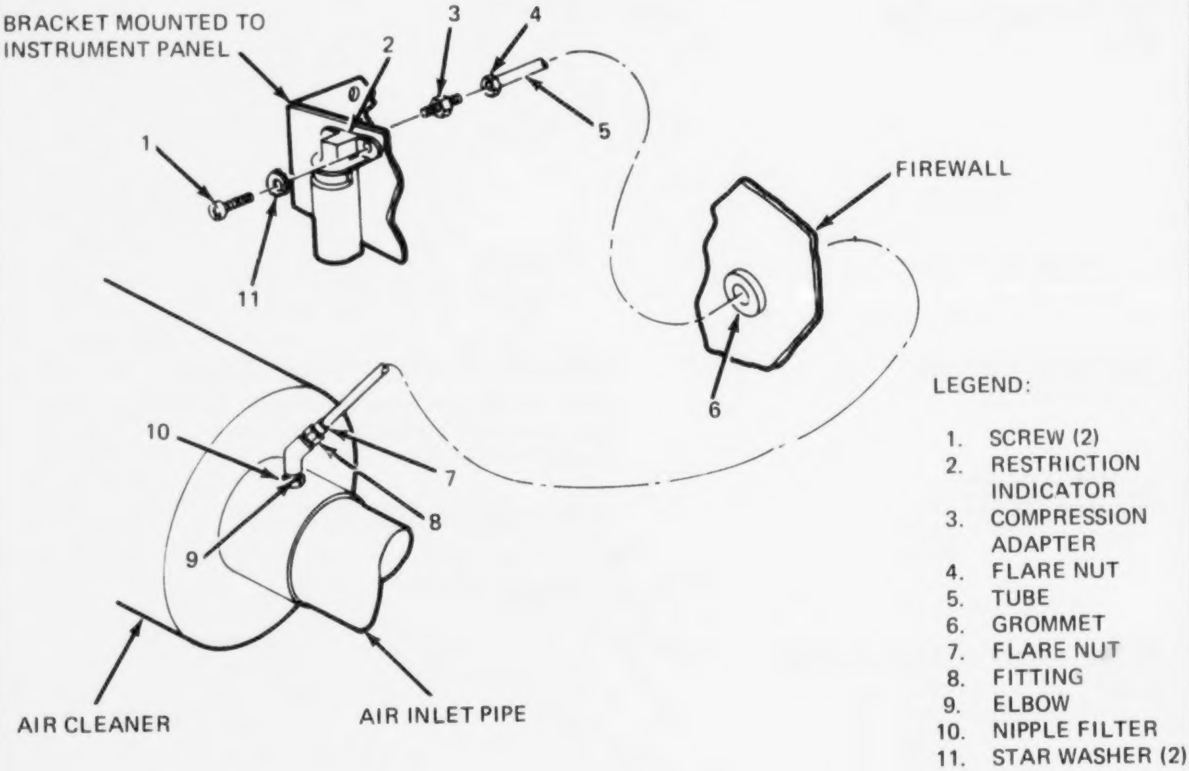
LOCATION/ITEM	ACTION	REMARKS
6. Flare nut (4).	Screw onto compression adapter (3) and tighten.	
C. TUBE AND FILTER REMOVAL.		
7. Flare nut (7).	Unscrew. Disconnect tube (5).	
8. Nipple filter (10).	Unscrew and remove from air cleaner with elbow (9) and fitting (8).	
9. Tube (5) and grommet (6).	Remove from firewall.	

FUEL AND AIR INTAKE SYSTEM.

4-26. AIR CLEANER RESTRICTION INDICATOR MAINTENANCE (Continued).

D. TUBE AND FILTER INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
10. Nipple filter (10), elbow (9) and fitting (8).	Screw onto air cleaner.	
11. Flare nut (7).	Screw onto connector (8).	
12. Tube (5) and grommet (6).	Install grommet. Insert tube through firewall.	
13. Flare nut (4).	Screw onto adapter (3).	Reach behind bracket.


BRACKET MOUNTED TO INSTRUMENT PANEL
1
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4
5
FIREWALL
11
6
10
7
8
9
AIR CLEANER
AIR INLET PIPE

LEGEND:

1. SCREW (2)
2. RESTRICTION INDICATOR
3. COMPRESSION ADAPTER
4. FLARE NUT
5. TUBE
6. GROMMET
7. FLARE NUT
8. FITTING
9. ELBOW
10. NIPPLE FILTER
11. STAR WASHER (2)

TA 074634

4-27. TURBO AIR INLET MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Inspection.	(5)
c. Installation.	(6)
d. Checking for Leaks.	(2)
	17 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Must be Clean as Dirt in the Air Passages Can Damage the Turbocharger and Engine.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

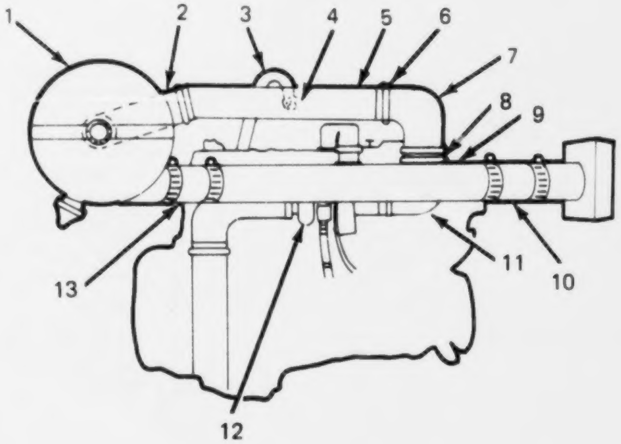
FUEL AND AIR INTAKE SYSTEM.

4-27. TURBO AIR INLET MAINTENANCE (Continued).

CAUTION

Dirt in the air passages can severely damage the turbocharger and engine. Be sure your work area is clean. Clean parts before installation. Cover openings to keep out dust while you are working.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six clamps (6).	Loosen.	
2. Clamp (4), hose (3).	Loosen and remove.	
3. Three elbow pipes (2), (7), and (9); three straight pipes (5), (8) and (9), and two boots (10) and (13).	Remove.	
B. INSPECTION.		
4. Three elbow pipes (2), (7), and (9); three straight pipes (5), (8) and (9), and two boots (10) and (13).	Inspect for a. cracks b. leaks c. blockage	Replace, if necessary.



LEGEND:

1. AIR CLEANER
2. ELBOW PIPE
3. HOSE
4. CLAMP
5. STRAIGHT PIPE
6. CLAMP (6)
7. ELBOW PIPE
8. STRAIGHT PIPE
9. STRAIGHT PIPE
10. BOOT
11. ELBOW PIPE
12. TURBOCHARGER
13. BOOT

TA 074635

FUEL AND AIR INTAKE SYSTEM.

4-27. TURBO AIR INLET MAINTENANCE (Continued).

C. INSTALLATION.

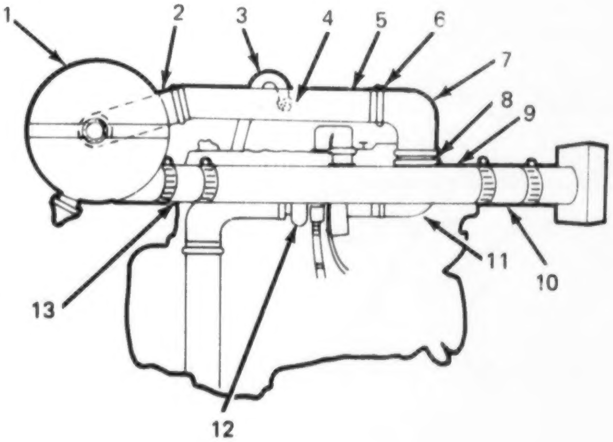
LOCATION/ITEM	ACTION	REMARKS
5. Two straight pipes (5) and (8).	Insert into elbow pipes (2), (7) and (11).	
6. Straight pipe (9).	Insert into two boots (10) and (13).	
7. Two elbow pipes (2) and (11).	Attach to turbocharger (12) and air cleaner (1).	
8. Six clamps (6).	Tighten to 32-36 lb-in (3.6-4.1 N·m).	

D. CHECKING FOR LEAKS.

LOCATION/ITEM	ACTION	REMARKS
9. Engine.	Start up (see TM 9-2320-273-10).	

WARNING

During normal operation, the turbocharger and outlet pipe can become very hot. Be careful not to touch these components with your bare hands. These components may be hot enough to cause severe burns.



LEGEND:

1. AIR CLEANER
2. ELBOW PIPE
3. HOSE
4. CLAMP
5. STRAIGHT PIPE
6. CLAMP (6)
7. ELBOW PIPE
8. STRAIGHT PIPE
9. STRAIGHT PIPE
10. BOOT
11. ELBOW PIPE
12. TURBOCHARGER
13. BOOT

TA 074636

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ENGINE RETARDER BRAKE.

4-28. ROCKER ARM HOUSING COVERS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Crossover Tube.	(5)
b. Removal of Cover.	(5)
c. Cleaning.	(20)
d. Installation of Cover.	(5)
e. Installation of Crossover Tube	(5)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Dry Cleaning Solvent (Refer to Appendix C).
Gasket for Crossover Tube
(Center Cover Only.) (216487).
Gasket for Rocker Arm Housing
(3009999).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-15A.	Breather Tube Removed (For Center Cover Only).
4-27A.	Turbo Air Inlet Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-4.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Must be Clean as Dirt in the Turbocharger and Engine Can Cause Damage.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

ENGINE RETARDER BRAKE.

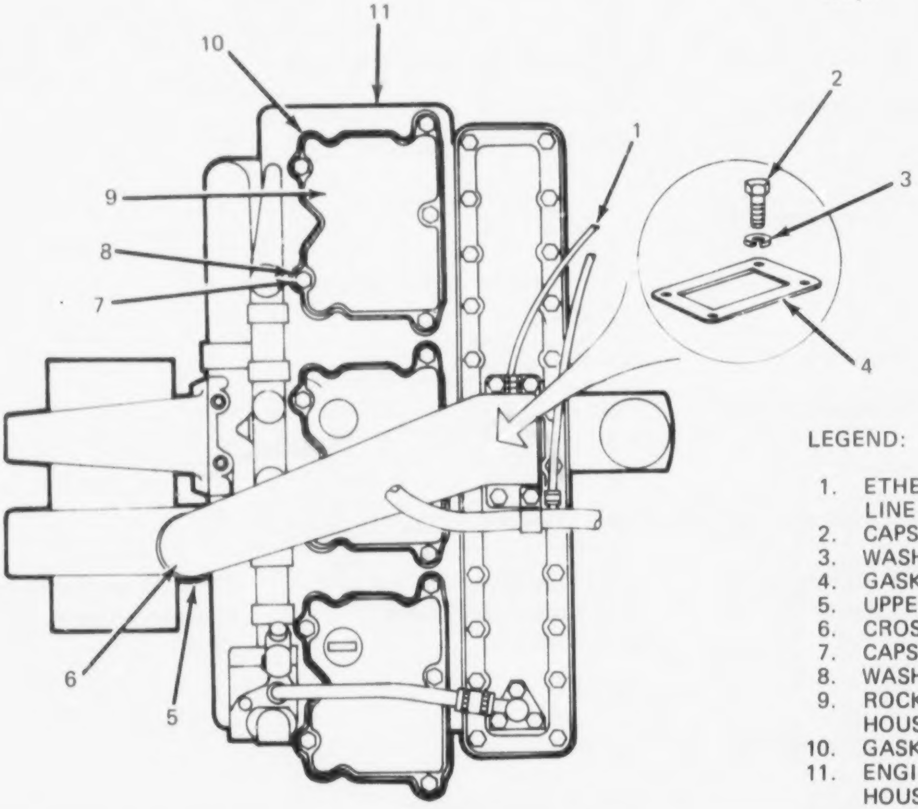
4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).

CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals on flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.

A. REMOVAL OF CROSSOVER TUBE (FOR CENTER COVER, ONLY).

LOCATION/ITEM	ACTION	REMARKS
1. Ether atomizer line (1).	Unscrew and remove.	
2. Four capscrews (2), washers (3), and gasket (4).	Unscrew and remove. Throw away gasket (4).	At this time tachograph cable and hose are free enough to move out of way.



LEGEND:

1. ETHER ATOMIZER LINE
2. CAPSCREW (4)
3. WASHER (4)
4. GASKET
5. UPPER CLAMP
6. CROSSOVER TUBE
7. CAPSCREW (5)
8. WASHER (5)
9. ROCKER ARM HOUSING COVER
10. GASKET
11. ENGINE RETARDER HOUSING

TA 074637

ENGINE RETARDER BRAKE.

4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF CROSSOVER TUBE (Continued).		
3. Upper clamp (5).	Loosen.	If rubber connector is damaged, replace.
4. Crossover tube (6).	Remove.	
B. REMOVAL OF COVER.		
5. Five capscrews (7), and washers (8).	Unscrew and remove.	
6. Rocker arm housing cover (9).	Lift off.	
7. Gasket (10).	Take off and throw away.	
C. CLEANING.		
8. Rocker arm housing cover (9).	Clean with dry cleaning solvent.	
9. Engine retarder housing (11).	Wipe grease from rim where gasket (10) rests.	
D. INSTALLATION OF COVER.		
10. New gasket (10).	Set in place on engine retarder housing (11).	
11. Rocker arm housing cover (9).	Set onto gasket (10).	
12. Capscrews (7) and washers (8).	Tighten to 15 lb-ft (20 N·m) with torque wrench.	
E. INSTALLATION OF CROSSOVER TUBE (CENTER COVER ONLY).		
13. Crossover tube (6) and new crossover tube gasket (4).	Hold in place and attach with capscrews (2) and washers (3).	Clamp down tachograph cable and hose at this time.
14. Upper clamp (5).	Tighten.	
15. Crossover tube capscrews (2).	Tighten.	
16. Ether atomizer line (1).	Connect and tighten.	

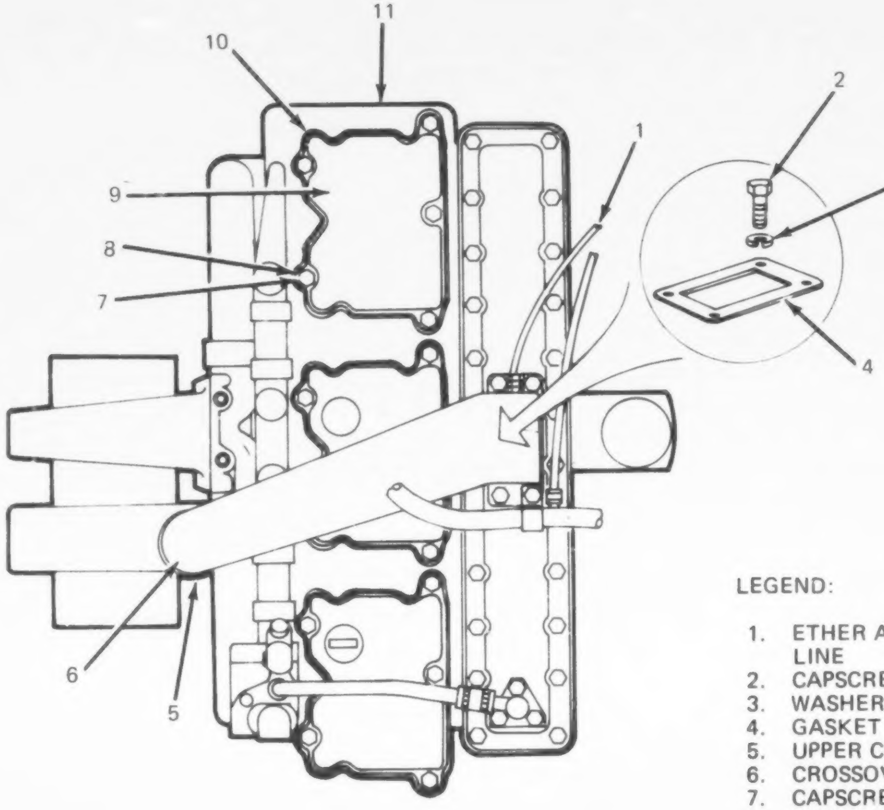
4-28. ROCKER ARM HOUSING COVERS MAINTENANCE (Continued).

LOCATION/ITEM **ACTION** **REMARKS**

NOTE

Follow-on maintenance action required if center cover was removed:

a. Install breather tube; refer to para 4-15D.
b. Install turbo air inlet; refer to para 4-27C.



LEGEND:

1. ETHER ATOMIZER LINE
2. CAPSCREW (4)
3. WASHER (4)
4. GASKET
5. UPPER CLAMP
6. CROSSOVER TUBE
7. CAPSCREW (5)
8. WASHER (5)
9. ROCKER ARM HOUSING COVER
10. GASKET
11. ENGINE RETARDER HOUSING

TA 074638

4-29. ENGINE RETARDER BRAKE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

Inspection. (20)

20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-28A.	Remove Crossover Tube.
4-28B.	Rocker Arm Housing Covers.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-4.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Must be Clean as Dirt in the Turbocharger and Engine can Cause Damage.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).

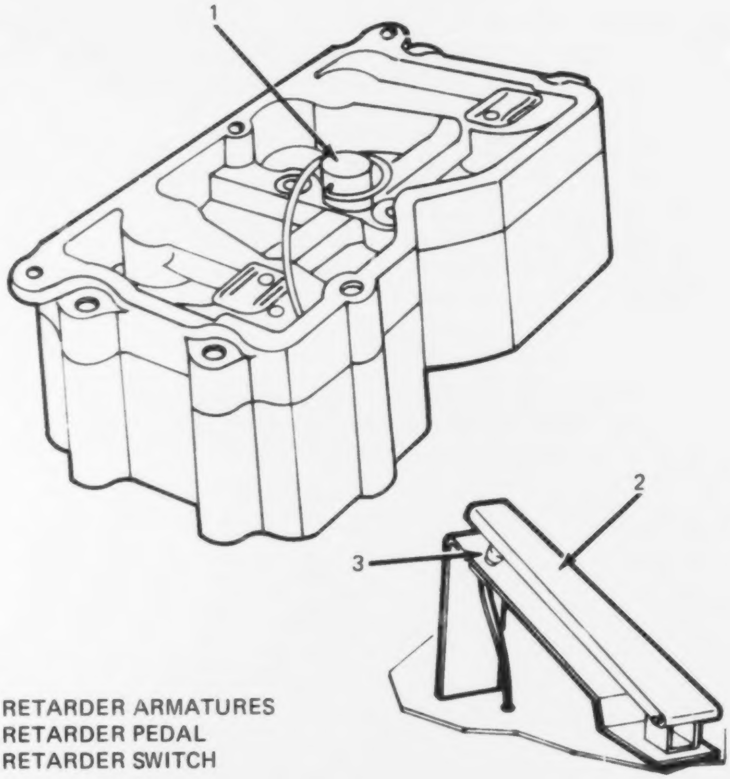
LOCATION/ITEM	ACTION	REMARKS

WARNING

During normal operation the turbocharger and outlet pipe can become very hot. Be careful not to touch these components with your bare hands. These components may be hot enough to cause serious burns.

CAUTION

You will be operating the engine with cover removed. Be absolutely certain that work area is clean and dust-free. Do not allow dirt, tools, or engine parts to fall into engine.



LEGEND:

1. ENGINE RETARDER ARMATURES
2. ENGINE RETARDER PEDAL
3. ENGINE RETARDER SWITCH

TA 074639

ENGINE RETARDER BRAKE.

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).

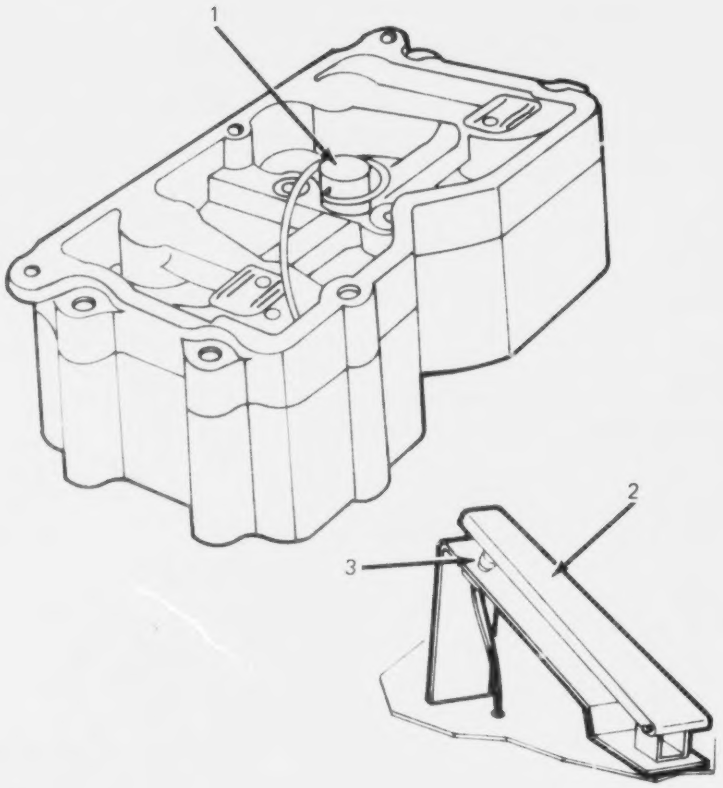
LOCATION/ITEM	ACTION	REMARKS
INSPECTION.		
1. Engine.	Start up (see TM 9-2320-273-10) (1st mechanic).	
2. Six engine retarder armatures (1).	Bleed brakes by pressing each engine retarder armature five or six times in a row. (2nd mechanic).	
3. Cab/Engine Retarder Switch (3).	a. Keep engine retarder pedal (2) pressed down to actuate engine retarder switch (3).	
	b. Start with dash selector switch at LOW.	Refer to TM 9-2320-273-10.
	c. Move to MED.	
	d. Move to HIGH. (1st mechanic).	
4. Engine retarder armatures (1).	Observe that: a. When dash selector switch is at LOW center armature remains down. b. When dash selector switch is moved to MED, center armature comes up, armature on ends go down. c. When dash selector switch is on HIGH, all armatures go down.	If brake does not work properly, refer problem to Direct Support Maintenance.

NOTE

Follow-on maintenance action required:
a. Install rocker arm housing covers, and crossover tube, para 4-28D and E.

4-29. ENGINE RETARDER BRAKE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. ENGINE RETARDER ARMATURES
2. ENGINE RETARDER PEDAL
3. ENGINE RETARDER SWITCH

TA 074640

ETHER QUICK-START SYSTEM.

4-30. ETHER CYLINDER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
c. Check Operation.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Ether Cylinder (2910-01-072-1783).

PERSONNEL REQUIRED

Two (MOS-63B20).
(2nd Mechanic Operates
Cab Control in Part C).

REFERENCES (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-3.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTIO
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

1. Coolant Temperature Must be Below 50°F or Ether Solenoid Valve Will Not Function.
2. Work in a Well Ventilated Area Away From Sparks or Flame.
3. Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive.
Be Alert for the Strong Odor of Spilled Ether.
Guard Against Flame or Sparks in Work Area.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-30. ETHER CYLINDER MAINTENANCE (Continued).

WARNING

Ether is highly explosive. Dispose of cylinder properly. Be alert for the strong odor of spilled ether. Guard against flame or sparks in work area.

A. REMOVAL.

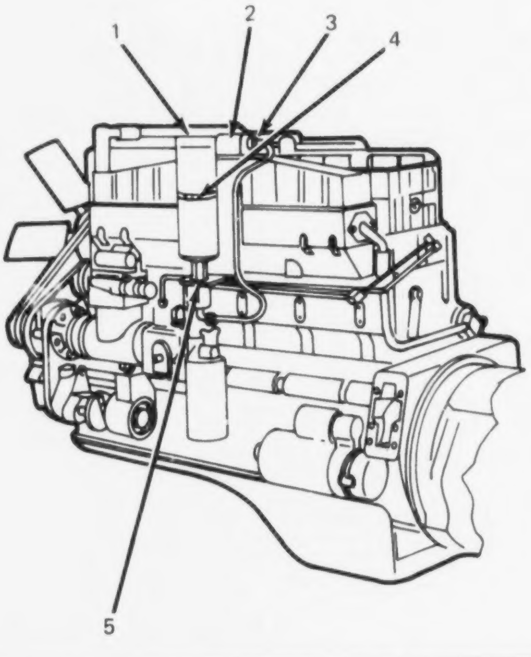
LOCATION/ITEM	ACTION	REMARKS
1. Clamp (4).	Loosen.	
2. Ether cylinder (1).	Unscrew from fitting (5) and lift out.	It may be necessary to hold fitting (5) with open-end wrench.

NOTE

Check neck of cylinder for dirt or lint prior to installation.

B. INSTALLATION.

3. Ether cylinder (1).	Screw into fitting (5).	
4. Clamp (4).	Tighten.	



LEGEND:

1. ETHER CYLINDER
2. CROSSOVER TUBE
3. ATOMIZER LINE
4. CLAMP
5. FITTING

TA 074641

ETHER QUICK-START SYSTEM.

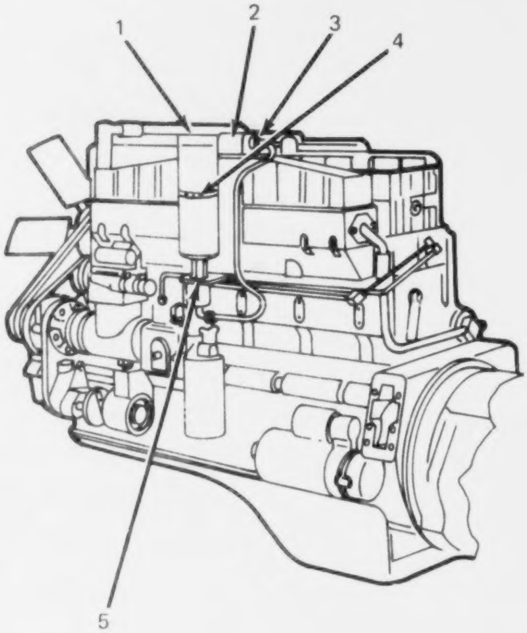
4-30. ETHER CYLINDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
	NOTE Coolant temperature must be below 50°F or solenoid valve will not function.	
C. OPERATIONAL CHECK.		
5. Atomizer Line (3).	Unscrew from crossover tube (2).	
6. INSTRUMENT PANEL/ Engine run switch.	Turn On.	Refer TM 9-2320-273-10 2nd Mechanic.
7. INSTRUMENT PANEL/ Ether button	Push and release.	
8. Atomizer Line (3)	Observe ether mist.	If mist is not observed, check ether temperature switch (para 5-74), solenoid valve (para 4-31), ether tube (para 4-33), and atomizer (para 4-32).
9. INSTRUMENT PANEL/ Engine run switch.	After check, turn OFF.	2nd Mechanic.
10. Atomizer Line (3).	Screw into crossover tube (2).	

ETHER QUICK-START SYSTEM.

4-30. ETHER CYLINDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. ETHER CYLINDER
2. CROSSOVER TUBE
3. ATOMIZER LINE
4. CLAMP
5. FITTING

TA 074642

4-31. SOLENOID VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(25)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Solenoid Valve, 913032-04 (06991).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-30A.	Ether Cylinder Removed.
9-11A.	Remove Alcohol Evaporator.

PERSONNEL REQUIRED

Two (MOS-63B20).
(2nd Mechanic Operates
Cab Control in Part C of Para 4-30.)

REFERENCES (TM)

TM 9-2320-273-20P

TROUBLESHOOTING REFERENCES

Table 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Coolant Temperature Must be Below 50°F or Ether Solenoid Valve Will Not Function.
Work in a Well Ventilated Area Away From Sparks or Flame.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive.
Be Alert for the Strong Odor of Spilled Ether.
Guard Against Flame or Sparks in Work Area.
Engine OFF; Transmission in Neutral.
Park Brake Set.

ETHER QUICK-START SYSTEM

4-31. SOLENOID VALVE MAINTENANCE (Continued).

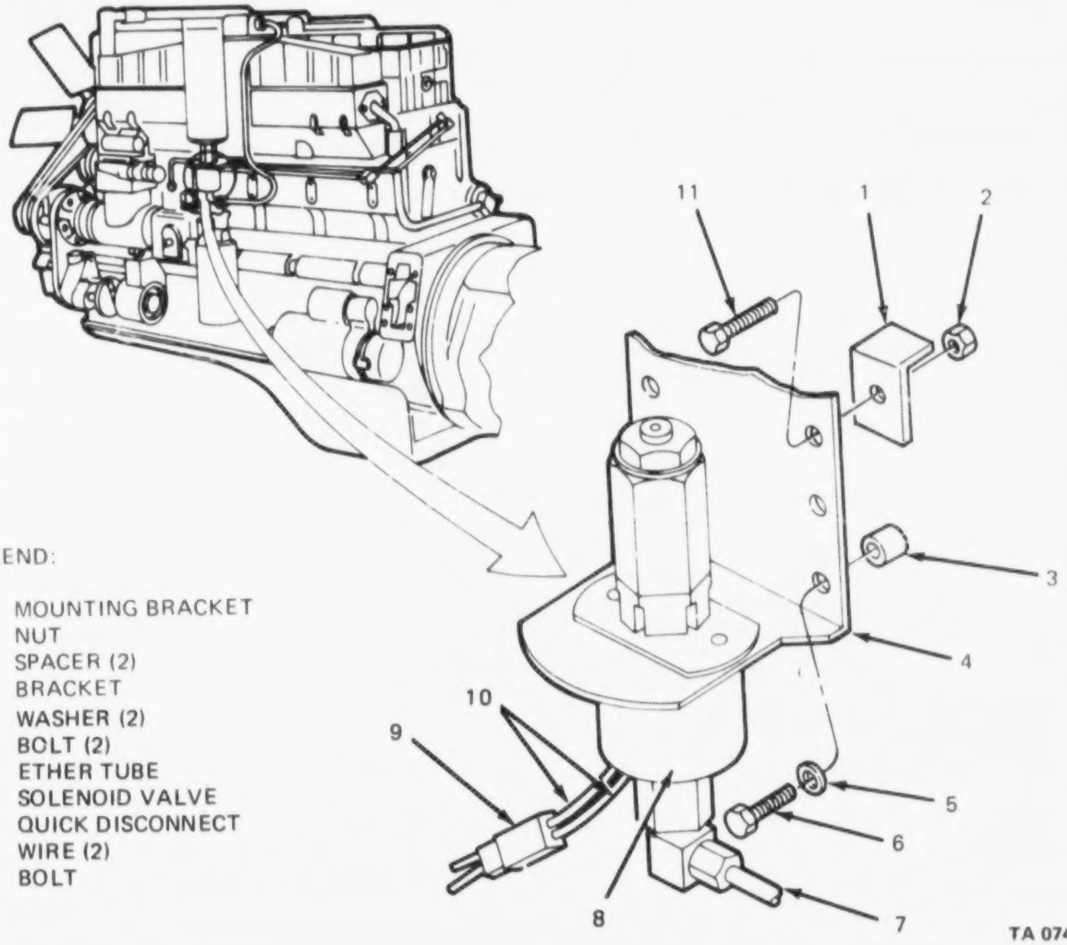
LOCATION/ITEM	ACTION	REMARKS

WARNING

Ether is highly explosive. Be alert for the strong odor of spilled ether. Guard against flames or sparks in work area.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two wires (10).	Unplug from quick-disconnect (9).	
2. Ether tube (7).	Unscrew from solenoid valve (8).	



LEGEND:

1. MOUNTING BRACKET
2. NUT
3. SPACER (2)
4. BRACKET
5. WASHER (2)
6. BOLT (2)
7. ETHER TUBE
8. SOLENOID VALVE
9. QUICK DISCONNECT
10. WIRE (2)
11. BOLT

TA 074643

ETHER QUICK-START SYSTEM.

4-31. SOLENOID VALVE MAINTENANCE (Continued).

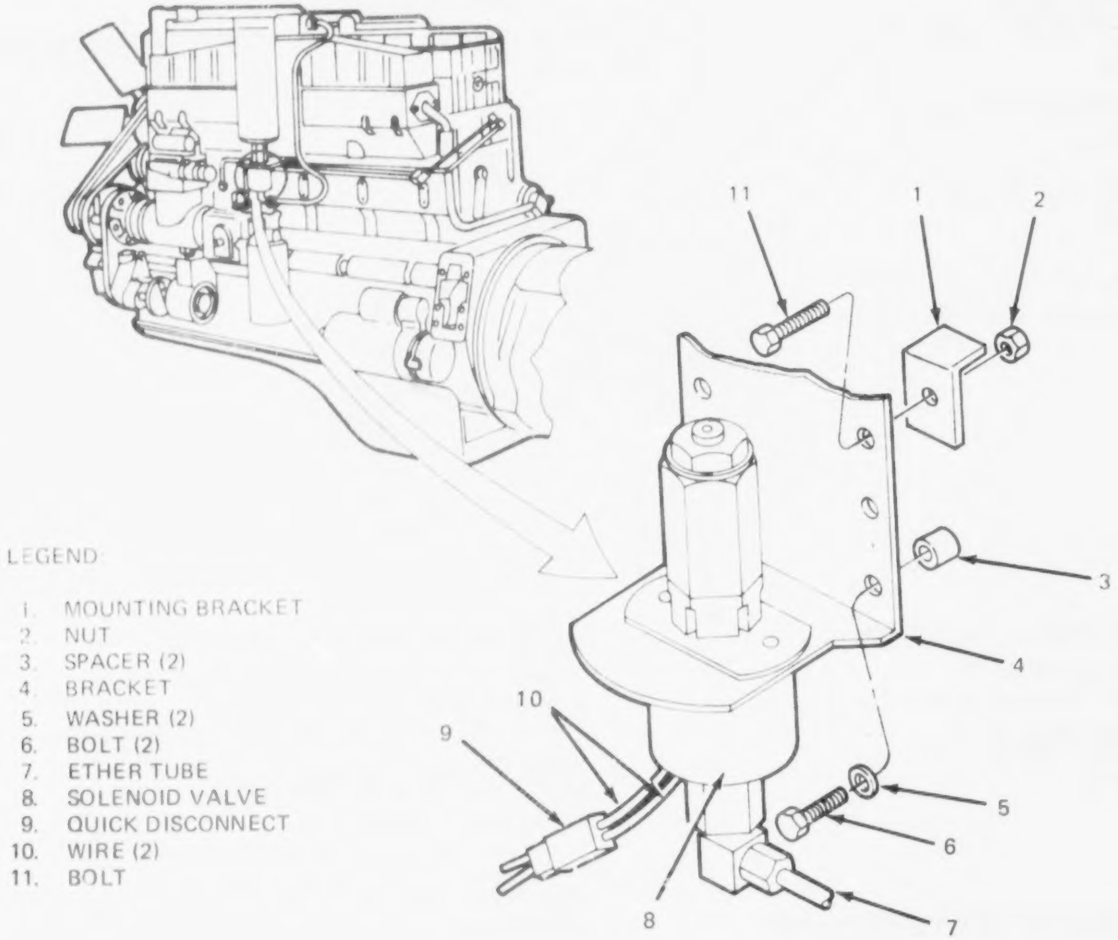
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two bolts (6), washers (5), and spacers (3).	Unscrew and remove.	
4. Bolt (11) and nut (2).	Unscrew and remove bracket (4) with solenoid valve (8) attached from mounting bracket (1).	
B. INSTALLATION.		
5. Bracket (4) with solenoid valve (8) attached.	Mount to engine with two bolts (6), washers (5), and spacers (3).	
6. Bolt (11) and nut (2).	Mount thru bracket (4) and mounting bracket (1) and tighten.	
7. Ether tube (7).	Screw onto solenoid valve (8).	
8. Quick disconnect (9).	Plug in two wires (10).	

NOTE

Follow-on maintenance required:
Install ether cylinder and check operation; see para 4-30 B and C.

4-31. SOLENOID VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. MOUNTING BRACKET
2. NUT
3. SPACER (2)
4. BRACKET
5. WASHER (2)
6. BOLT (2)
7. ETHER TUBE
8. SOLENOID VALVE
9. QUICK DISCONNECT
10. WIRE (2)
11. BOLT

TA 074644

4-32. ATOMIZER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation and Operational Check.	(3)
	5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Atomizer, 91302406 (06991).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Two (MOS-63B20).
(2nd Mechanic Operates Cab Controls in Part B.)

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

Table 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

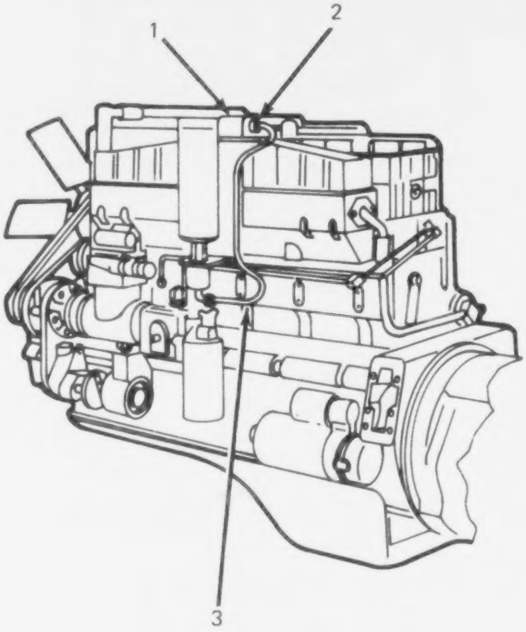
Coolant Temperature Must Be Below 50°F or Ether Solenoid Valve Will Not Function.
Work in a Well Ventilated Area Away from Sparks or Flame.
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive.
Be Alert for the Strong Odor of Spilled Ether.
Guard Against Flame or Sparks in Work Area.
Engine OFF: Transmission in Neutral.
Park Brake Set.

4-32. ATOMIZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Atomizer (2).	a. Unscrew ether tube (3) and remove. b. Unscrew from crossover tube (1).	



LEGEND:

1. CROSSOVER TUBE
2. ATOMIZER
3. ETHER TUBE

TA 074645

ETHER QUICK-START SYSTEM.

4-32. ATOMIZER MAINTENANCE (Continued).

NOTE

Coolant temperature must be below 50°F or solenoid valve will not function.

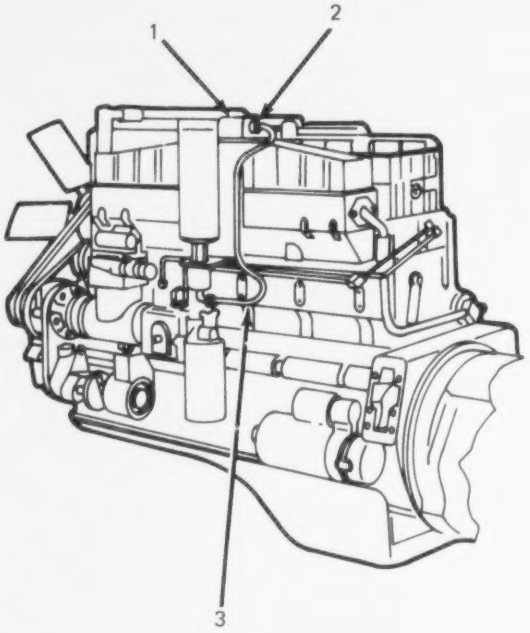
B. INSTALLATION AND OPERATIONAL CHECK.

LOCATION/ITEM	ACTION	REMARKS
2. Ether tube (3).	Screw on atomizer (2).	
INSTRUMENT PANEL/		
3. Ether button.	Push (2nd mechanic).	Engine run switch must be ON.
4. Atomizer (2).	Observe ether mist from atomizer (2) (2nd mechanic).	If mist is not observed, check ether temperature switch (para 5-74), ether cylinder (para 4-30), solenoid valve (para 4-31), and ether tube (para 4-33).
INSTRUMENT PANEL/		
5. Engine run switch.	Engine run switch OFF (2nd mechanic).	
6. Atomizer (2).	a. Remove from ether tube (3). b. Screw into crossover tube (1).	
7. Ether tube (3).	Screw into atomizer (2).	

ETHER QUICK-START SYSTEM.

4-32. ATOMIZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CROSSOVER TUBE
2. ATOMIZER
3. ETHER TUBE

TA 074646

ETHER QUICK-START MAINTENANCE.

4-33. ETHER TUBE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection.	(5)
c. Installation.	(10)
d. Operational Check.	(5)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Two (MOS-63B20).
(2nd Mechanic Operates Cab Controls in Part D.)

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

Table 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Coolant Temperature Must be Below 50°F or Ether Solenoid Valve Will Not Function.

Work in a Well Ventilated Area Away From Sparks or Flame.

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Ether is Highly Explosive. Be Alert for the Strong Odor of Spilled Ether. Guard Against Flame or Sparks in Work Area.

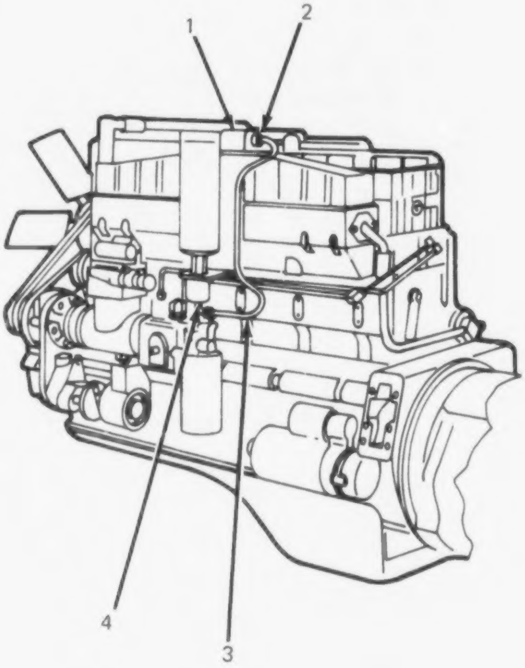
Engine OFF.

Transmission in Neutral.

Park Brake Set.

4-33. ETHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Ether tube (3).	a. Unscrew from atomizer (2). b. Unscrew from solenoid valve (4).	
2. Atomizer (2).	Unscrew from crossover tube (1).	



LEGEND:

1. CROSSOVER TUBE
2. ATOMIZER
3. ETHER TUBE
4. SOLENOID VALVE

TA 074647

4-33. ETHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
3. Ether tube (3), solenoid valve (4), atomizer (2).	Look for: a. Cracks. b. Leaks. c. Kinks. d. Damaged fittings.	Replace, if necessary.
C. INSTALLATION.		
4. Ether tube (3).	a. Screw onto solenoid valve (4). b. Screw onto atomizer (2).	

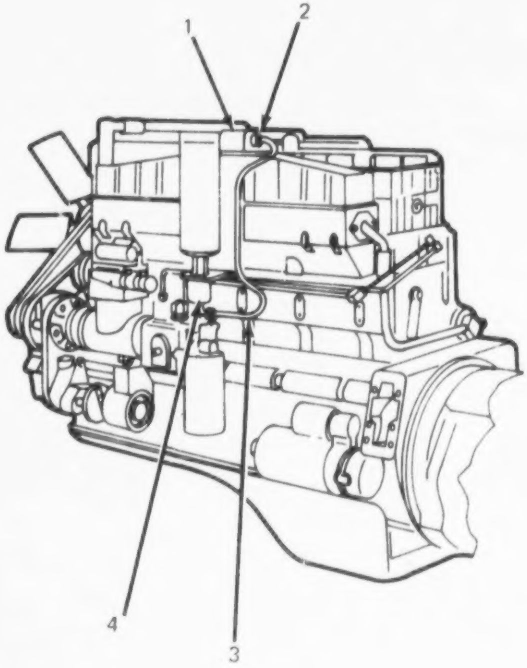
NOTE

Coolant temperature must be below 50°F or solenoid valve will not function.

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK.		
5. INSTRUMENT PANEL/ Ether button.	Push (2nd mechanic).	Engine run switch must be ON.
6. Atomizer (2).	Observe ether mist (1st mechanic).	If mist is not observed, check ether temperature switch (para 5-74) ether cylinder (para 4-30), solenoid valve (para 4-31), and atomizer (para 4-32).
7. INSTRUMENT/PANEL. Engine run switch.	Turn OFF (2nd mechanic).	
8. Atomizer (2).	a. Unscrew from ether tube (3). b. Screw into crossover tube (1).	
9. Ether tube (3).	Screw onto atomizer (2).	

4-33. ETHER TUBE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CROSSOVER TUBE
2. ATOMIZER
3. ETHER TUBE
4. SOLENOID VALVE

TA 074648

EXHAUST SYSTEM.

4-34. TURBO OUTLET PIPE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Inspection of Mating Flanges.	(5)
c.	Installation.	(10)
d.	Checking for Leaks.	(5)
		25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Coupling, 5-0-1259LJ (76700).
Coupling (3), 5-0-1236BJ (76700).
Locknut (M916/M920) M/219B-20002 (34623).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

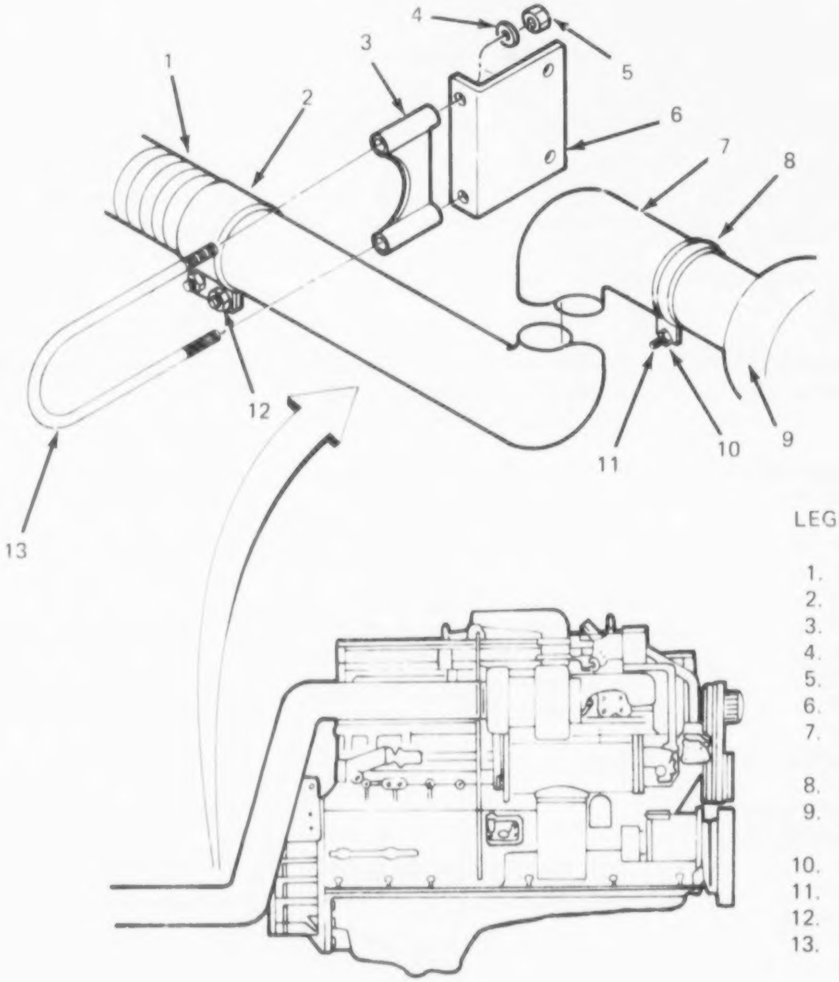
Wait Until Exhaust Components are Cool.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.



LEGEND:

1. FLEX PIPE
2. COUPLING
3. SPACER
4. WASHER (2)
5. CLAMP NUT (2)
6. BRACKET
7. TURBOCHARGER OUTLET PIPE
8. CLAMP
9. TURBOCHARGER OUTLET
10. LOCKNUT
11. BOLT
12. COUPLING NUT (2)
13. U-CLAMP

TA 074649

EXHAUST SYSTEM.

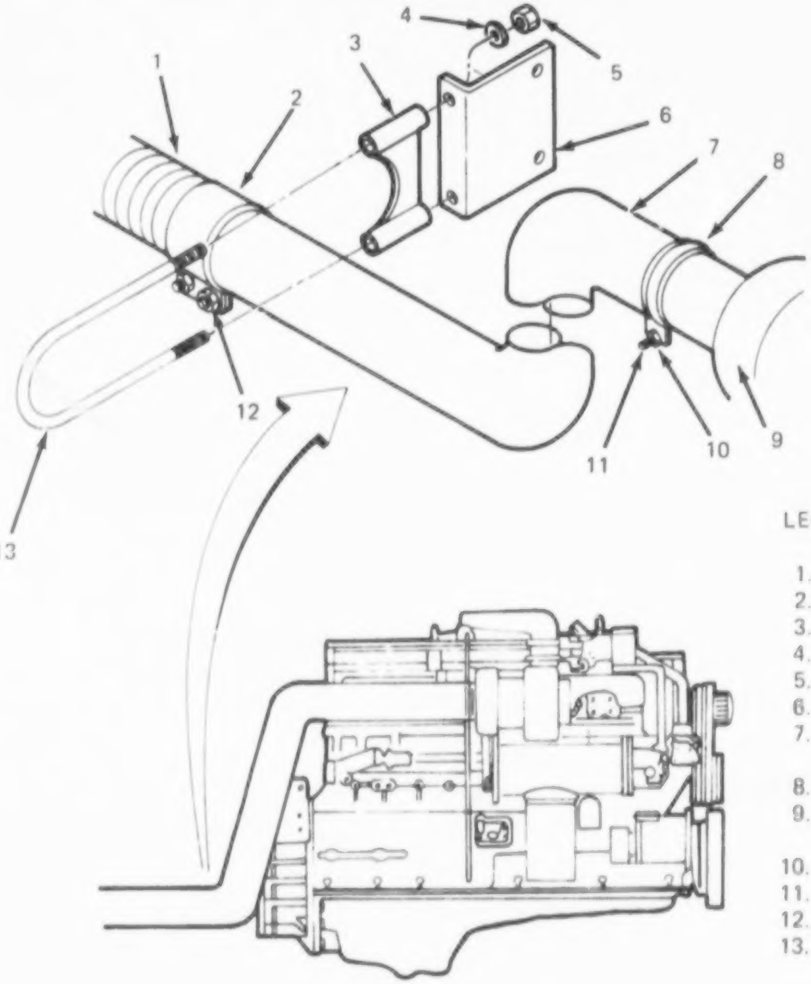
4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Locknut (10) and bolt (11).	Unscrew and remove clamp (8).	Replace locknut (10).
2. Two coupling nuts (12).	Loosen.	
3. Two clamp nuts (5) and washers (4).	Unscrew and remove U-clamp (13) and spacer (3) from bracket (6).	
4. Turbocharger outlet pipe (7).	Remove.	
5. Coupling (2).	Remove and discard.	
B. INSPECTION OF MATING FLANGES.		
6. End of turbocharger outlet (9), turbocharger outlet pipe (7), and flex pipe (1).	Check for: a. Burrs. b. Cracks. c. Distortion.	Replace (1) and (7) if necessary, or refer to Direct Support for (9).
C. INSTALLATION.		
7. Turbocharger outlet pipe (7), U-clamp (13), spacer (3).	Position at bracket (6) and install with two washers (4) and clamp nuts (5).	Do not tighten clamp nuts (5) yet.
8. Turbocharger outlet (9).	a. Aline with turbocharger outlet pipe (7). b. Secure with clamp (8), bolt (11), and locknut (10).	
9. New coupling (2).	a. Position at connection of flex pipe (1) and turbocharger outlet pipe (7). b. Secure with two new coupling nuts (12).	 Use torque wrench and tighten to 45 lb-ft (61 N·m).
10. Two clamp nuts (5).	Tighten.	
D. CHECKING FOR LEAKS.		
11. Engine.	Start up (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-34. TURBO OUTLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING FOR LEAKS (Continued).		
12. Coupling (2) and clamp (8).	Listen for leaks.	Tighten two coupling nuts (12) or locknut (10) as necessary.
13. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. FLEX PIPE
2. COUPLING
3. SPACER
4. WASHER (2)
5. CLAMP NUT (2)
6. BRACKET
7. TURBOCHARGER OUTLET PIPE
8. CLAMP
9. TURBOCHARGER OUTLET
10. LOCKNUT
11. BOLT
12. COUPLING NUT (2)
13. U-CLAMP

TA 074650

4-35. FLEX PIPES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Inspection of Mating Flanges.	(5)
c.	Installation.	(10)
d.	Checking for Leaks.	(5)
		25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Couplings (3), 5.0-1236BJ (76700).
Coupling, 5.0-1259LJ (76700).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

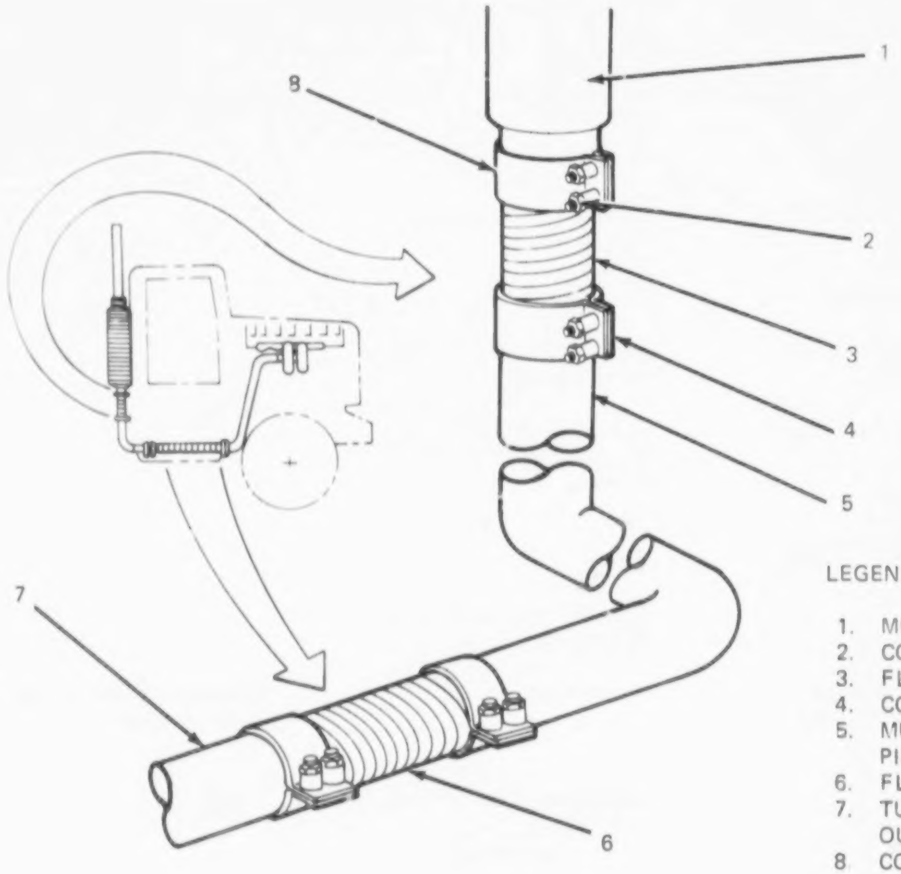
Wait Until Exhaust Components are Cool.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

4 35. FLEX PIPES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.



LEGEND:

1. MUFFLER
2. COUPLING NUT (8)
3. FLEX PIPE
4. COUPLING (3)
5. MUFFLER INLET PIPE
6. FLEX PIPE
7. TURBOCHARGER OUTLET PIPE
8. COUPLING

TA 074651

EXHAUST SYSTEM.

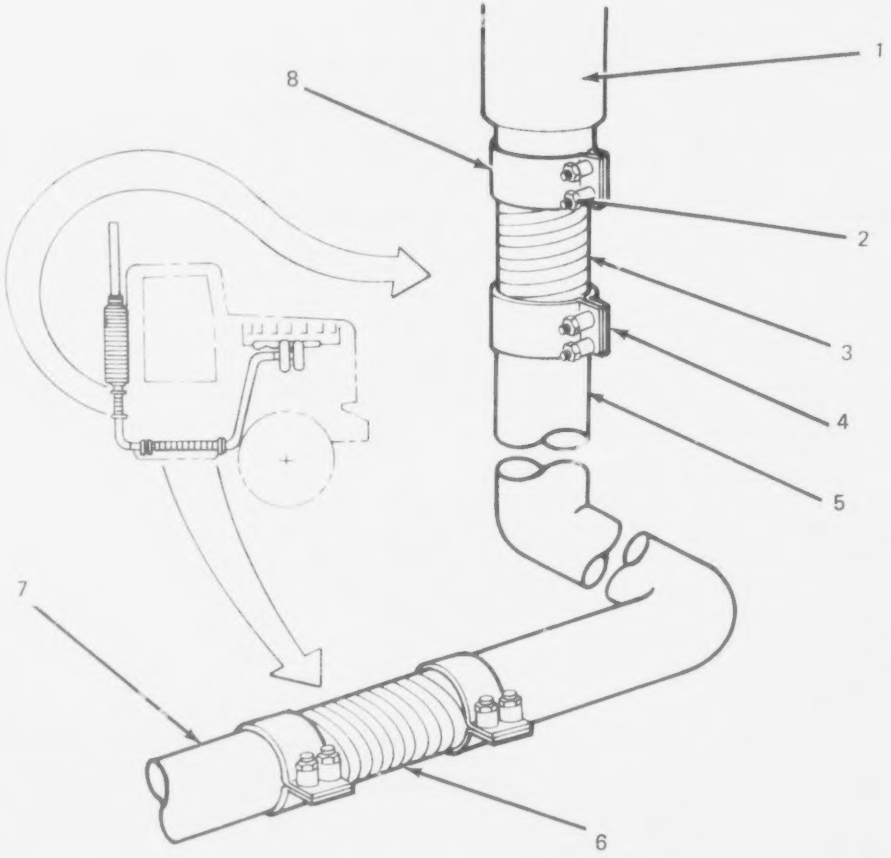
4-35. FLEX PIPES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Eight coupling nuts (2).	Loosen and slide three couplings (4) and coupling (8) onto flex pipes (3) and (6).	
2. Flex pipes (3) and (6).	Remove.	
3. Three couplings (4) and coupling (8).	Remove and discard.	
B. INSPECTION OF MATING FLANGES.		
4. Turbocharger outlet pipe (7), muffler inlet pipe (5), muffler (1), and flex pipes (3) and (6).	Inspect pipes and pipe ends for: a. Cracks. b. Distortion. c. Burring.	Replace if necessary.
C. INSTALLATION.		
5. Three new couplings (4) and coupling (8).	Slide onto flex pipes (3) and (6).	
6. Flex pipes (3) and (6).	Put in place.	
7. Three new couplings (4) and coupling (8).	Slide into position over connections.	
8. Eight coupling nuts (2).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
D. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Flex pipes (3) and (6); three couplings (4) and coupling (8).	Listen for leaks	Retighten coupling nuts (2) as necessary.
11. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-35. FLEX TUBES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. MUFFLER
2. COUPLING NUT (8)
3. FLEX PIPE
4. COUPLING (3)
5. MUFFLER INLET PIPE
6. FLEX PIPE
7. TURBOCHARGER OUTLET PIPE
8. COUPLING

TA 074652

EXHAUST SYSTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(6)
b. Inspection of Mating Flanges.	(5)
c. Installation.	(10)
d. Checking for Leaks.	(5)
	26 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Coupling (2), 5.0-1236BJ (76700).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

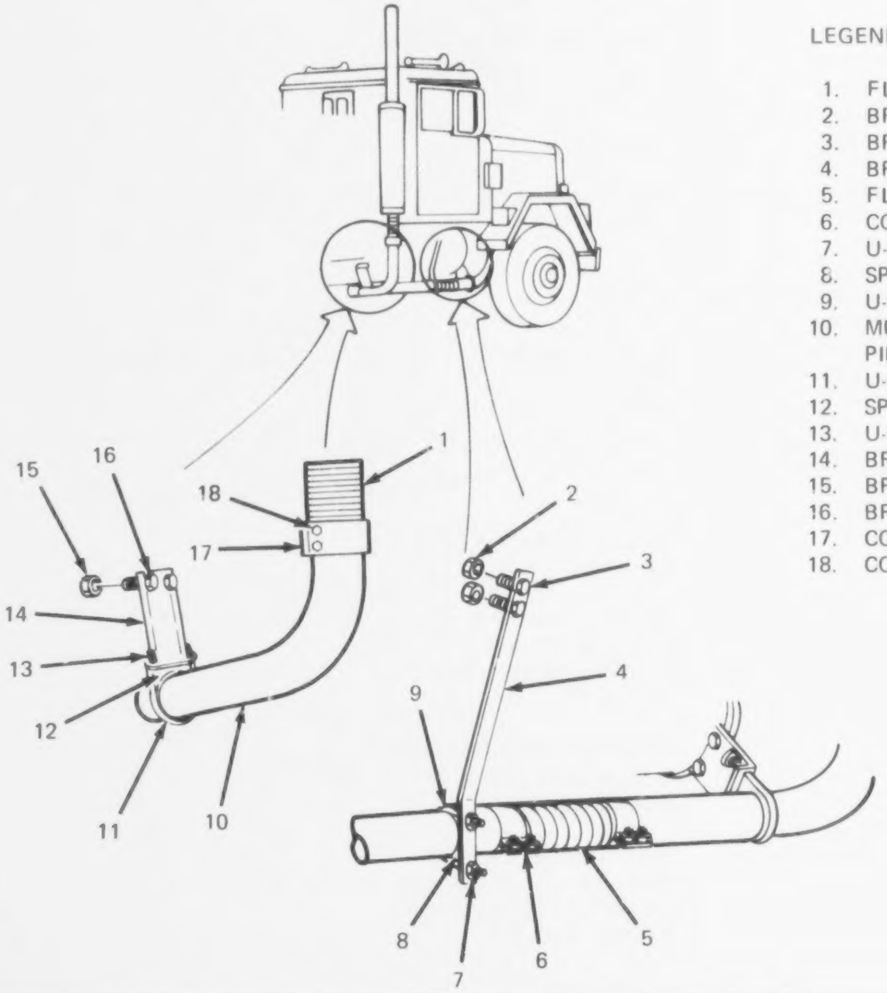
Wait Until Exhaust Components are Cool.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.



LEGEND:

1. FLEX PIPE
2. BRACKET NUT (2)
3. BRACKET BOLT (2)
4. BRACKET
5. FLEX PIPE
6. COUPLING
7. U-CLAMP NUT (2)
8. SPACER
9. U-CLAMP
10. MUFFLER INLET PIPE
11. U-CLAMP
12. SPACER
13. U-CLAMP NUT (2)
14. BRACKET
15. BRACKET NUT (2)
16. BRACKET BOLT (2)
17. COUPLING
18. COUPLING NUT (4)

TA 074653

EXHAUST SYTEM.

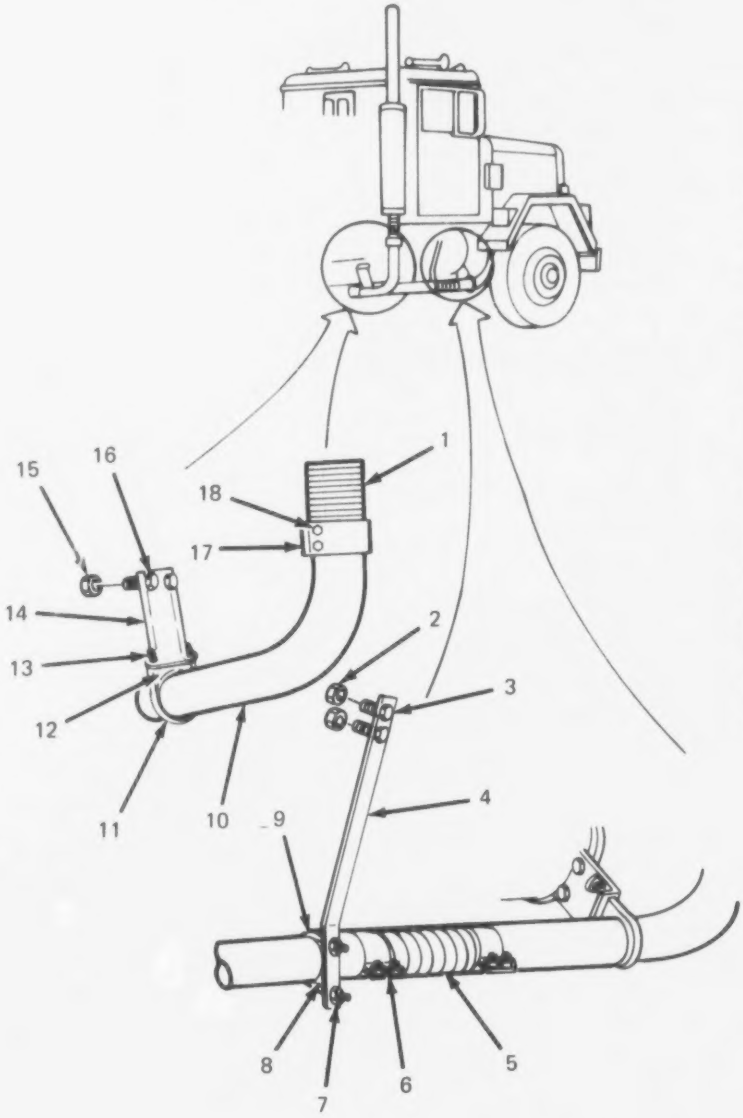
4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two U-clamp nuts (7).	Unscrew and remove spacer (8) and U-clamp (9).	
2. Two bracket bolts (3) and two bracket nuts (2).	Unscrew and remove bracket (4).	
3. Two U-clamp nuts (13).	Unscrew and remove spacer (12) and U-clamp (11).	
4. Two bracket bolts (16) and two bracket nuts (15).	Unscrew and remove bracket (14).	
5. Four coupling nuts (18).	Loosen and slide couplings (6) and (17) onto muffler inlet pipe (10).	
6. Muffler inlet pipe (10).	Remove.	
7. Couplings (6) and (17).	Slide from muffler inlet pipe (10).	Discard couplings.
B. INSPECTION OF MATING FLANGES.		
8. Flex pipes (1) and (5) and muffler inlet pipe (10).	Inspect pipes for: a. Burrs. b. Cracks. c. Distortion.	Replace as necessary.
C. INSTALLATION.		
9. Two new couplings (6) and (17).	Slide onto muffler inlet pipe (10).	
10. Muffler inlet pipe (10).	Set in position and slide couplings (6) and (17) over ends of flex pipes (1) and (5).	
11. Bracket (14).	Install to vehicle with two bracket bolts (16) and bracket nuts (15).	
12. U-clamp (11) and spacer (12).	Position around muffler inlet pipe (10) and secure to bracket (14) with two U-clamp nuts (13).	

EXHAUST SYTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FLEX PIPE
2. BRACKET NUT (2)
3. BRACKET BOLT (2)
4. BRACKET
5. FLEX PIPE
6. COUPLING
7. U-CLAMP NUT (2)
8. SPACER
9. U-CLAMP
10. MUFFLER INLET PIPE
11. U-CLAMP
12. SPACER
13. U-CLAMP NUT (2)
14. BRACKET
15. BRACKET NUT (2)
16. BRACKET BOLT (2)
17. COUPLING
18. COUPLING NUT (4)

TA 074654

EXHAUST SYSTEM.

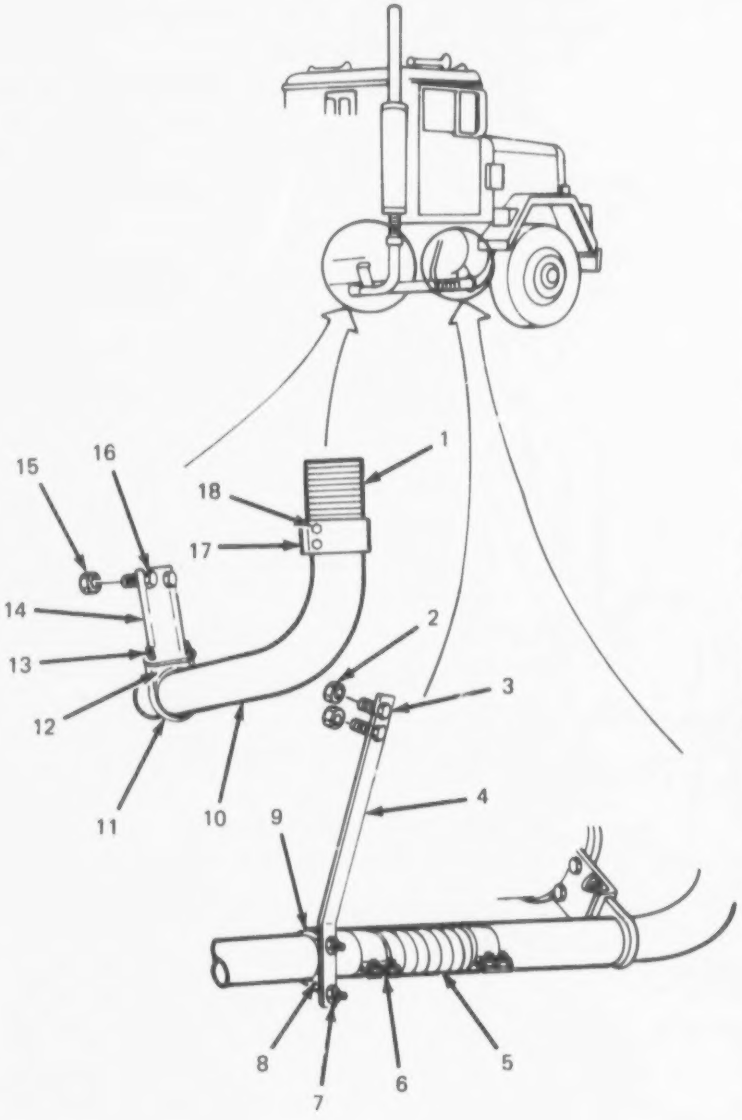
4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
13. Bracket (4).	Install to vehicle with two bracket bolts (3) and bracket nuts (2).	
14. U-clamp (9) and spacer (8).	Position around muffler inlet pipe (10) and secure to bracket (4) with two U-clamp nuts (7).	
15. Four coupling nuts (18).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
D. CHECKING FOR LEAKS.		
16. Engine.	Start up (see TM 9-2320-273-10).	
17. Muffler inlet pipe (10).	Listen for leaks.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYTEM.

4-36. MUFFLER INLET PIPE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FLEX PIPE
2. BRACKET NUT (2)
3. BRACKET BOLT (2)
4. BRACKET
5. FLEX PIPE
6. COUPLING
7. U-CLAMP NUT (2)
8. SPACER
9. U-CLAMP
10. MUFFLER INLET PIPE
11. U-CLAMP
12. SPACER
13. U-CLAMP NUT (2)
14. BRACKET
15. BRACKET NUT (2)
16. BRACKET BOLT (2)
17. COUPLING
18. COUPLING NUT (4)

TA 075641

EXHAUST SYSTEM

4-37. MUFFLER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection of Mating Flanges.	(5)
c. Installation.	(10)
d. Checking for Leaks.	(5)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Coupling, 5.0-1259LJ (76700).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Wait Until Exhaust Components Are Cool.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

EXHAUST SYSTEM.

4-37. MUFFLER MAINTENANCE (Continued).

WARNING

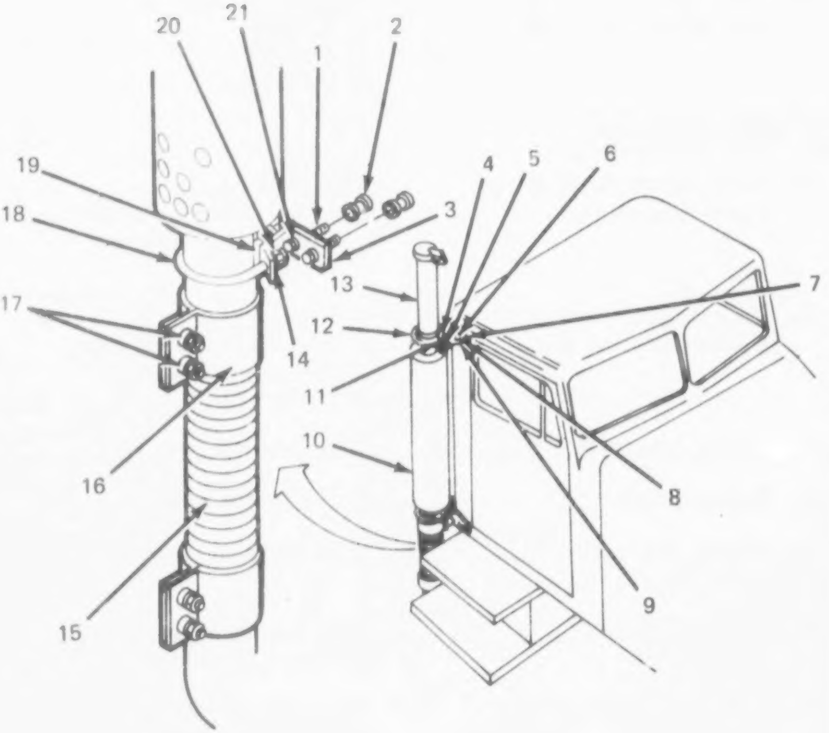
During normal operation the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two coupling nuts (17).	Loosen and slide coupling (16) down over flex pipe (15).	
2. Two U-clamp nuts (5) and U-clamp washers (4).	Unscrew and remove U-clamp (2) and spacer (11).	

LEGEND:

1. BRACKET BOLT (4)
2. INSULATOR (4)
3. U-CLAMP BRACKET
4. U-CLAMP WASHER (2)
5. U-CLAMP NUT (2)
6. U-CLAMP BRACKET
7. BRACKET BOLT (4)
8. BRACKET WASHER (4)
9. INSULATOR (4)
10. MUFFLER
11. SPACER
12. U-CLAMP
13. EXHAUST STACK
14. U-CLAMP WASHER (2)
15. FLEX PIPE
16. COUPLING
17. COUPLING NUT (2)
18. U-CLAMP
19. SPACER
20. U-CLAMP NUT (2)
21. BRACKET WASHER (4)



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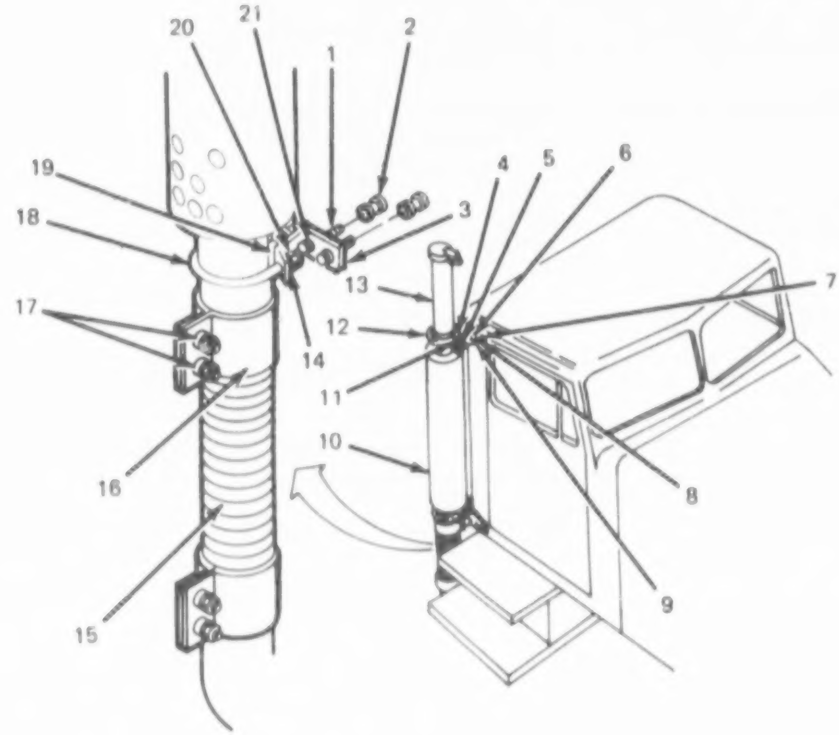
4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Four bracket bolts (7), bracket washers (8) and insulators (9).	Unscrew and remove U-clamp bracket (6).	
4. Two U-clamp nuts (20) and U-clamp washers (14).	Unscrew and remove U-clamp (18) and spacer (19).	
5. Muffler (10) and exhaust stack (13).	Remove from flex pipe (15).	If muffler (10) is to be replaced, pull exhaust stack (13) from muffler.
6. Four bracket bolts (1), bracket washers (21), and insulators (2).	Unscrew and remove U-clamp bracket (3).	
7. Coupling (16).	Slide off of flex tube (15).	Discard coupling (16).
B. INSPECTION OF MATING FLANGES.		
8. Flex pipe (15), muffler (10), and exhaust stack (13).	Inspect pipe ends for: a. Burrs. b. Cracks. c. Distortion.	Replace as necessary.
C. INSTALLATION.		
9. Four insulators (2) and U-clamp bracket (3).	a. Position to cab. b. Install with four bracket bolts (1) and bracket washers (21).	
10. Four insulators (9) and U-clamp bracket (6).	a. Position to cab. b. Install with four bracket bolts (7) and bracket washers (8).	
11. New coupling (16).	Slide over flex pipe (15).	
12. Exhaust stack (13).	Slide into top of muffler (10).	If removed.
13. Muffler (10) and exhaust stack (13).	Slide into flex pipe (15).	
14. Coupling (16).	Slide up over connection of muffler (10) and flex pipe (15).	
15. Two coupling nuts (17).	Tighten to 45 lb-ft (61 N·m) with torque wrench.	
16. U-clamp (18) and spacer (19).	Position around muffler (10) at U-clamp bracket (3).	

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BRACKET BOLT (4)
2. INSULATOR (4)
3. U-CLAMP BRACKET
4. U-CLAMP WASHER (2)
5. U-CLAMP NUT (2)
6. U-CLAMP BRACKET
7. BRACKET BOLT (4)
8. BRACKET WASHER (4)
9. INSULATOR (4)
10. MUFFLER
11. SPACER
12. U-CLAMP
13. EXHAUST STACK
14. U-CLAMP WASHER (2)
15. FLEX PIPE
16. COUPLING
17. COUPLING NUT (2)
18. U-CLAMP
19. SPACER
20. U-CLAMP NUT (2)
21. BRACKET WASHER (4)

TA 074656

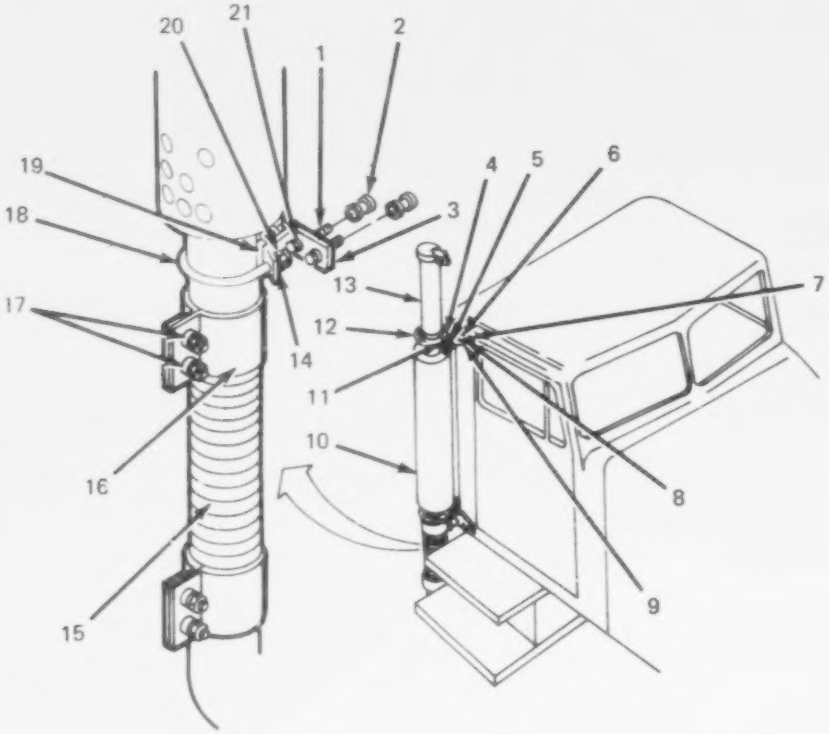
EXHAUST SYSTEM .

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
17. Two-U-clamp washers (14) and U-clamp nuts (20).	Screw onto U-clamp (18) and tighten.	
18. U-clamp (12) and spacer (11).	Position around muffler (10) and exhaust stack (13) at U-clamp bracket (6).	
19. Two U-clamp washers (4) and U-clamp nuts (5).	Screw onto U-clamp (12) and tighten.	
D. CHECKING FOR LEAKS.		
20. Engine.	Start up (see TM 9-2320-273-10).	
21. Muffler (10).	If muffler is leaking, you will hear a hissing sound.	Tighten connections as necessary.
22. Engine.	Shut down (see TM 9-2320-273-10).	

4-37. MUFFLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BRACKET BOLT (4)
2. INSULATOR (4)
3. U-CLAMP BRACKET
4. U-CLAMP WASHER (2)
5. U-CLAMP NUT (2)
6. U-CLAMP BRACKET
7. BRACKET BOLT (4)
8. BRACKET WASHER (4)
9. INSULATOR (4)
10. MUFFLER
11. SPACER
12. U-CLAMP
13. EXHAUST STACK
14. U-CLAMP WASHER (2)
15. FLEX PIPE
16. COUPLING
17. COUPLING NUT (2)
18. U-CLAMP
19. SPACER
20. U-CLAMP NUT (2)
21. BRACKET WASHER (4)

TA 074656

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4-38. EXHAUST STACK MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Inspection of Mating Flanges and Rain Cap.	(5)
c.	Installation.	(5)
d.	Checking for Leaks.	(5)
		20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Wait Until Exhaust Components are Cool.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

EXHAUST SYSTEM.

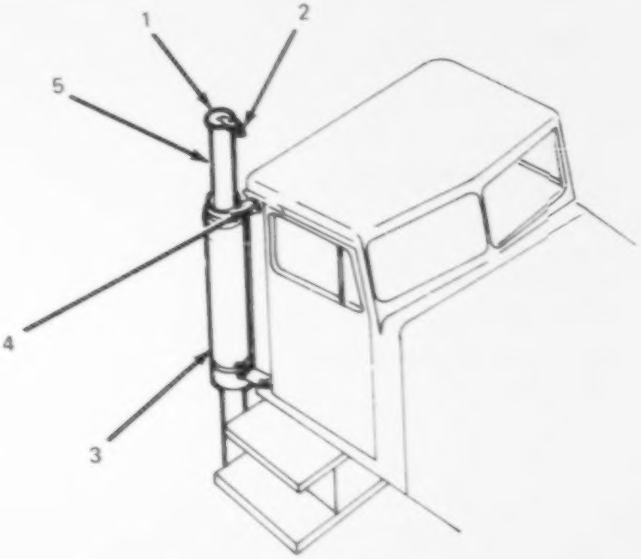
-38. EXHAUST STACK MAINTENANCE (Continued).

WARNING

During normal operation, the exhaust pipes and muffler can become very hot. Be careful not to touch these components with your bare hands. Do not allow your body to come in contact with the hot pipes or muffler. Exhaust system components may be hot enough to cause serious burns.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two U-clamp nuts (4).	Loosen.	
2. Exhaust stack (5).	Lift up out of U-clamp and muffler (3).	



LEGEND:

1. RAIN CAP
2. NUT
3. MUFFLER
4. U-CLAMP NUT (2)
5. EXHAUST STACK

TA 074657

EXHAUST SYSTEM.

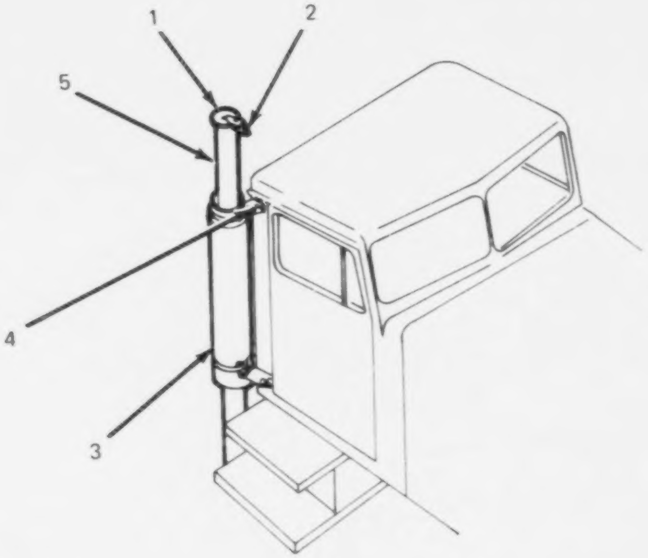
4-38. EXHAUST STACK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Nut (2).	Unscrew and remove rain cap (1).	
B. INSPECTION OF MATING FLANGES AND RAIN CAP.		
4. Exhaust stack (5) and muffler (3).	Inspect ends for: a. Burrs. b. Cracks. c. Distortions.	Replace if necessary.
5. Rain cap (1).	Check for free movement and a good seal to top of exhaust stack (5).	Replace if necessary.
C. INSTALLATION.		
6. Rain cap (1).	Position on exhaust stack (5) and tighten nut (2).	
7. Exhaust stack (5).	Slide into muffler (3).	
8. Two U-clamp nuts (4).	Tighten.	
D. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Exhaust stack (5).	Listen for leaks, and tighten U-clamp nuts (4) as necessary.	
11. Engine.	Shut down (see TM 9-2320-273-10).	

EXHAUST SYSTEM.

4-38. EXHAUST STACK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RAIN CAP
2. NUT
3. MUFFLER
4. U-CLAMP NUT (2)
5. EXHAUST STACK

TA 074658

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Inspection.	(10)
b. Removal.	(15)
c. Installation.	(20)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
None.

TROUBLESHOOTING REFERENCES
Table 4-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Coolant Drained.

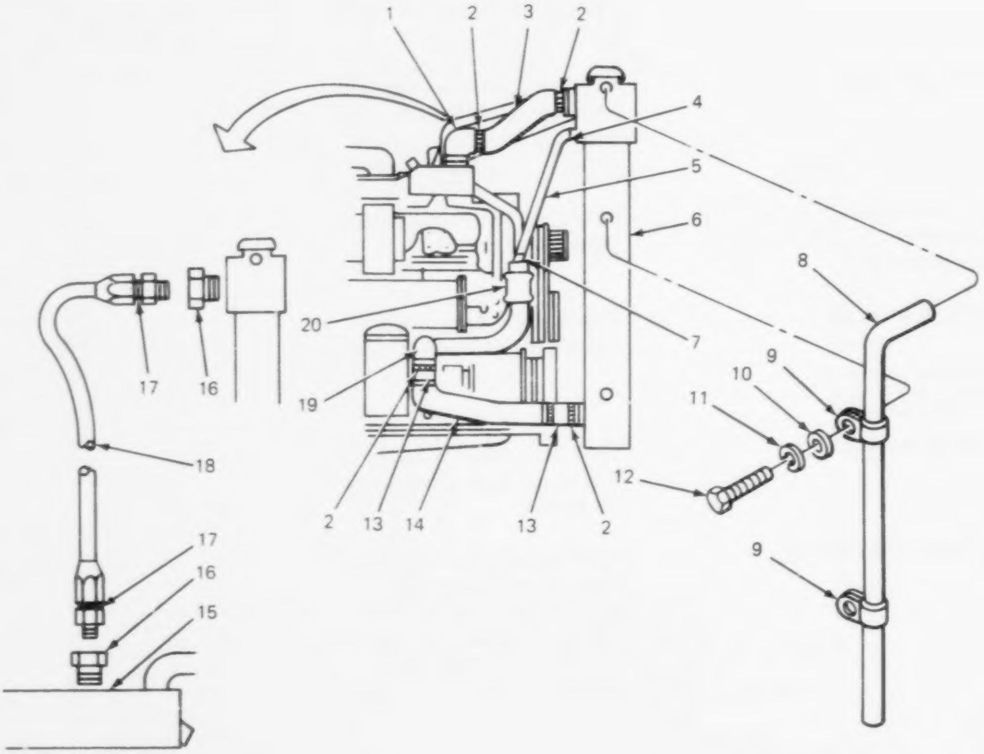
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. INSPECTION.		
1. Radiator inlet hose (3), water pump aeration hose (5), overflow hose (8), two radiator outlet hoses (13), radiator outlet tube (14) and radiator aeration hose (18).	Check for: a. Cracks. b. Kinks. c. Stains (may indicate leaks).	If hoses or tube are leaking or damaged, replace.



LEGEND:

1. INLET ELBOW
2. HOSE CLAMP (6)
3. RADIATOR INLET HOSE
4. HOSE CLAMP
5. WATER PUMP AERATION HOSE
6. RADIATOR
7. HOSE CLAMP
8. OVERFLOW HOSE
9. HOSE RETAINER (2)
10. FLAT WASHER (2)
11. LOCKWASHER (2)
12. CAPSCREW (2)
13. RADIATOR OUTLET HOSE (2)
14. RADIATOR OUTLET TUBE
15. FRONT WATER MANIFOLD
16. REDUCER (2)
17. CONNECTOR (2)
18. RADIATOR AERATION HOSE
19. OUTLET FITTING
20. OUTLET HOUSING

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COOLING SYSTEM.

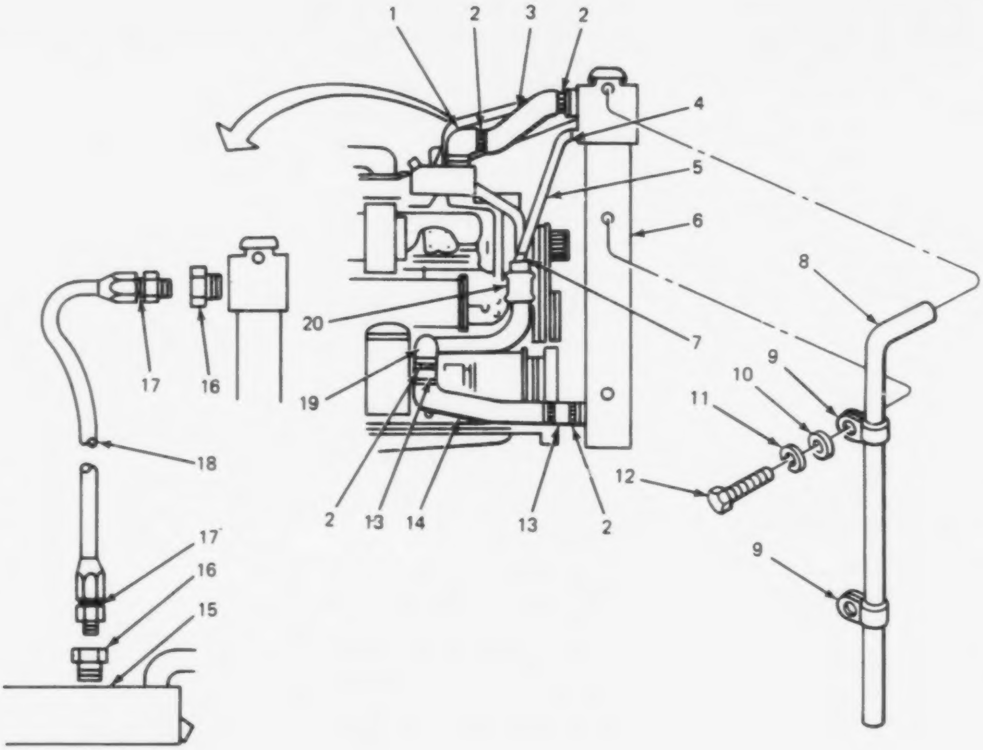
4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. REMOVAL.		
2. Two hose clamps (2).	Unscrew and remove radiator inlet hose (3).	
3. Hose clamp (4) and hose clamp (7).	Unscrew and remove water pump aeration hose (5).	
4. Two connectors (17).	Unscrew and remove radiator aeration hose (18).	
5. Two reducers (16).	Unscrew from radiator (6) and front water manifold (15).	
6. Four hose clamps (2).	Unscrew and remove two radiator outlet hoses (13) and radiator outlet tube (14).	
7. Two capscrews (12), lockwashers (11), and flat washers (10).	Unscrew and remove two hose retainers (9).	
8. Overflow hose (8).	Remove by twisting and pulling from barb fitting.	
C. INSTALLATION.		
9. Overflow hose (8).	Turn and push onto barb fitting on side of radiator fill neck.	
10. Two hose retainers (9).	Position around overflow hose (8) and secure to side of radiator (6) with two capscrews (12), lockwashers (11), and flat washers (10).	

COOLING SYSTEM.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. INLET ELBOW
2. HOSE CLAMP (6)
3. RADIATOR INLET HOSE
4. HOSE CLAMP
5. WATER PUMP AERATION HOSE
6. RADIATOR
7. HOSE CLAMP
8. OVERFLOW HOSE
9. HOSE RETAINER (2)
10. FLAT WASHER (2)
11. LOCKWASHER (2)
12. CAPSCREW (2)
13. RADIATOR OUTLET HOSE (2)
14. RADIATOR OUTLET TUBE
15. FRONT WATER MANIFOLD
16. REDUCER (2)
17. CONNECTOR (2)
18. RADIATOR AERATION HOSE
19. OUTLET FITTING
20. OUTLET HOUSING

TA211960

4-39. RADIATOR HOSES MAINTENANCE (Continued).

C. INSTALLATION (Continued).

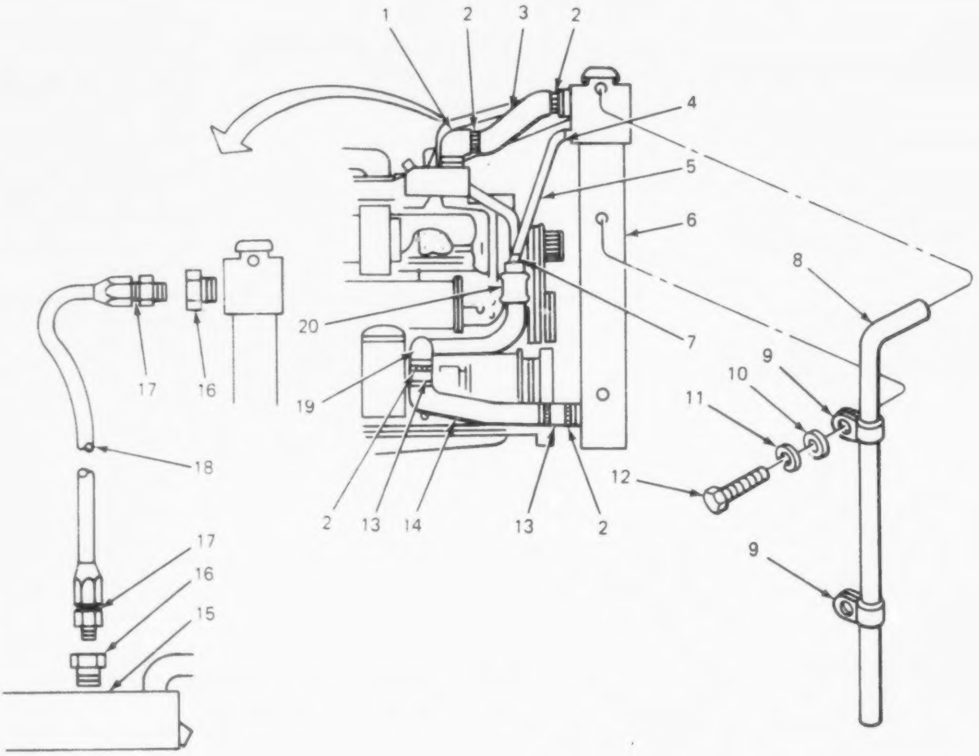
LOCATION/ITEM	ACTION	REMARKS
11. Two radiator outlet hoses (13), radiator outlet tube (14), and four hose clamps (2).	a. Slide radiator outlet hose (13) over ends of radiator outlet tube (14). b. Slide four hose clamps (2) over radiator outlet hoses (13). c. Slide one radiator outlet hose (13) over outlet fitting (19) and secure with two hose clamps (2). d. Slide other radiator outlet hose (13) over outlet of radiator (6) and secure with two hose clamps (2).	
12. Two reducers (16).	a. Apply liquid teflon to threads. b. Screw into top of radiator (6) and front water manifold (15).	
13. Radiator aeration hose (18) with two connectors (17).	Screw connectors (17) into two reducers (16).	
14. Water pump aeration hose (5), hose clamp (4), and hose clamp (7).	a. Slide hose clamps (4) and (7) over water pump aeration hose (5). b. Secure water pump aeration hose (5) to top of radiator (6) and top of outlet housing (20) with hose clamps (4) and (7).	
15. Radiator inlet hose (3) and two hose clamps (2).	a. Slide hose clamps (2) over radiator inlet hose (3). b. Secure radiator inlet hose (3) to top of radiator (6) and inlet elbow (1) with two hose clamps (2).	

NOTE

Follow-on maintenance required:
Install draincock, fill with coolant, and check for leaks; refer to para 4-42B, C, and D. Fill with Arctic Anti-Freeze if sub-zero conditions are anticipated.

4-39. RADIATOR HOSES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. INLET ELBOW
2. HOSE CLAMP (6)
3. RADIATOR INLET HOSE
4. HOSE CLAMP
5. WATER PUMP AERATION HOSE
6. RADIATOR
7. HOSE CLAMP
8. OVERFLOW HOSE
9. HOSE RETAINER (2)
10. FLAT WASHER (2)
11. LOCKWASHER (2)
12. CAPSCREW (2)
13. RADIATOR OUTLET HOSE (2)
14. RADIATOR OUTLET TUBE
15. FRONT WATER MANIFOLD
16. REDUCER (2)
17. CONNECTOR (2)
18. RADIATOR AERATION HOSE
19. OUTLET FITTING
20. OUTLET HOUSING

TA211961

4-40. RADIATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(25)
b. Installation.	(30)
	55 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Insulators (2) CBA 24-500 (76005).
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Drain Coolant.
11-32A.	Hood Removed.
11-16E.	Brush Guard Removed (M916 thru M920).
11-16A.	Grille Removed.
10-22A.	Steering Pump Cooler Hoses Removed.
6-10A.	Transmission Oil Cooler Hoses Removed.

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES
Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

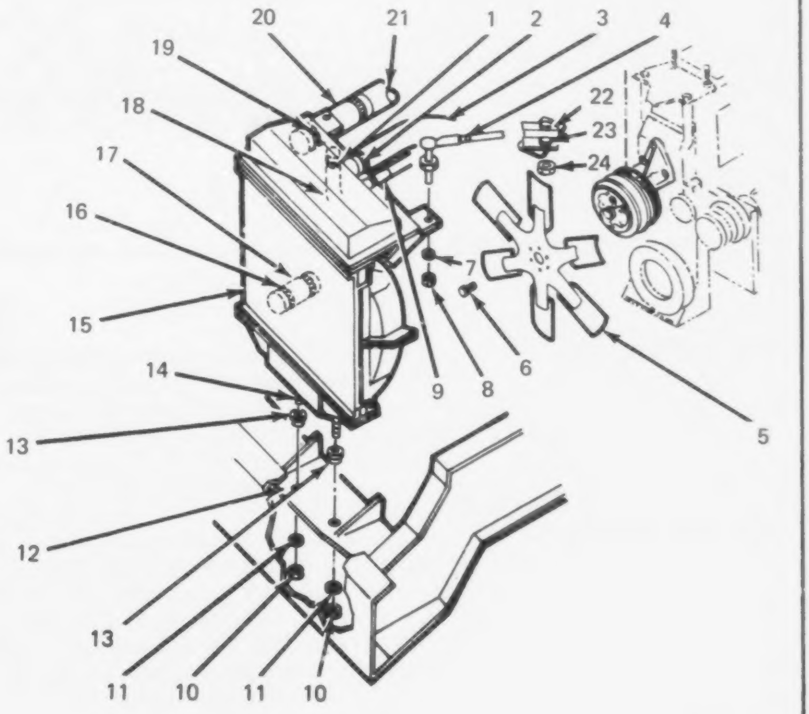
4-40. RADIATOR MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Radiator aeration hose (9).	Unscrew fitting from connector in radiator top tank.	
2. Three hose clamps (1), (2), and (16).	Loosen and remove inlet hose (3), pump aeration hose (18) and outlet hose (17) from radiator (15).	
3. Two clamps (19).	Loosen. Slide boot (20) onto air filter inlet tube (21).	If desired, loosen forward clamp at opposite end of tube and remove tube.
4. Two nuts (8) and washers (7).	Loosen and remove.	
5. Two nuts (10) and washers (11).	Loosen and remove.	

LEGEND:

1. HOSE CLAMP
2. HOSE CLAMP
3. INLET HOSE
4. ROD ARM (2)
5. FAN
6. CAPSCREW (6)
7. WASHER (2)
8. NUT (2)
9. RADIATOR AERATION HOSE
10. NUT (2)
11. WASHER (2)
12. SUPPORT
13. INSULATOR (2)
14. MOUNTING STUD (2)
15. RADIATOR
16. HOSE CLAMP
17. OUTLET HOSE
18. PUMP AERATION HOSE
19. CLAMP (2)
20. BOOT
21. AIR FILTER INLET TUBE
22. CLAMP (2)
23. CLAMP BOLT (2)
24. NUT (2)



TA 074661

COOLING SYSTEM.

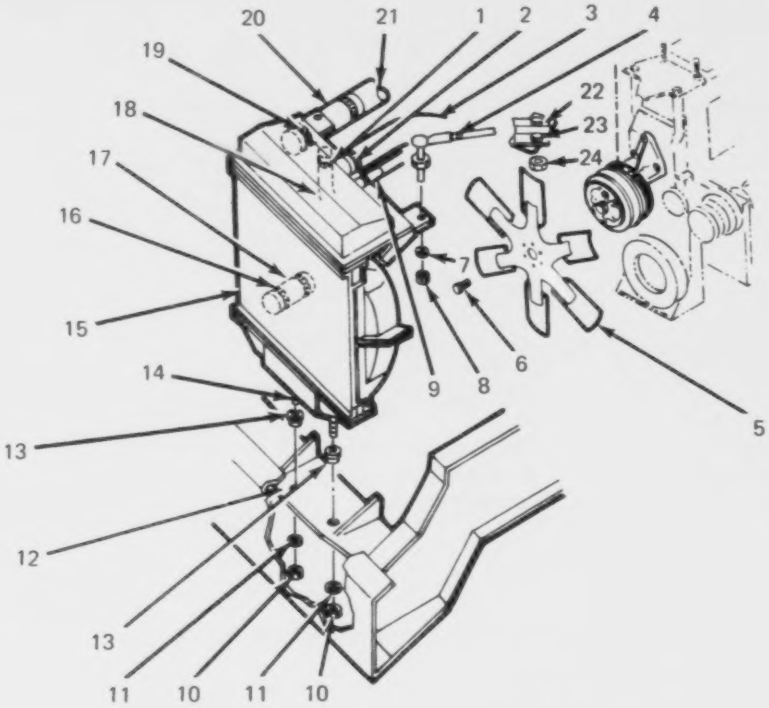
4-40. RADIATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
6. Two rod arms (4).	a. Remove two nuts (8) and washers (7). b. Remove two rod arms and attached ball studs from radiator. c. If required, separate rods by removing two nuts (24), clamp bolts (23) and clamps (22) from center of rod arms (4).	
7. Radiator (15).	a. Tilt forward and support. b. Remove six capscrews (6) from fan (5) and remove fan. c. Lift radiator (15) enough to clear insulators (13) and remove.	If lifting device is available, install lifting eyes in rod arm holes.
8. Two insulators (13).	a. Remove. b. Throw away.	
	NOTE To remove shrouds from radiator assembly refer to paragraph 4-41, Fan Shrouds Maintenance.	
B. INSTALLATION.		
9. Two new insulators (13).	Position on mounting studs (14).	You may use tape to hold the insulators in place.
10. Radiator (15).	a. Aline mounting studs (14) with support (12). Set in place. b. Tilt forward and support. Install six capscrews (6) into fan (5). Torque to 25-32 lb-ft (33.9 to 43.4 N·m).	
11. Two rod arms (4).	a. If separated, install two nuts (24), clamp bolts (23), and clamps (22) thru center of rod arms (4) and tighten. b. Insert in top support bracket. c. Install two washers (7) and nuts (8). Tighten.	

COOLING SYSTEM.

4-40. RADIATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. HOSE CLAMP
2. HOSE CLAMP
3. INLET HOSE
4. ROD ARM (2)
5. FAN
6. CAPSCREW (6)
7. WASHER (2)
8. NUT (2)
9. RADIATOR AERATION HOSE
10. NUT (2)
11. WASHER (2)
12. SUPPORT
13. INSULATOR (2)
14. MOUNTING STUD (2)
15. RADIATOR
16. HOSE CLAMP
17. OUTLET HOSE
18. PUMP AERATION HOSE
19. CLAMP (2)
20. BOOT
21. AIR FILTER INLET TUBE
22. CLAMP (2)
23. CLAMP BOLT (2)
24. NUT (2)

TA 074662

COOLING SYSTEM.

4-40. RADIATOR MAINTENANCE (Continued).

B. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
12. Two washers (11) and nuts (10).	Install and tighten.	
13. Air filter inlet tube (21).	a. If removed, reinsert at filter end and tighten forward clamp. b. Slide boot (20) onto air inlet and tighten two clamps (19).	
14. Three hose clamps (1), (2) and (16).	Reinstall inlet hose (3) pump aeration hose (18) and outlet hose (17) to radiator. Position clamps and tighten.	
15. Radiator aeration hose (9).	Apply liquid teflon to fitting and screw into connector.	

NOTE

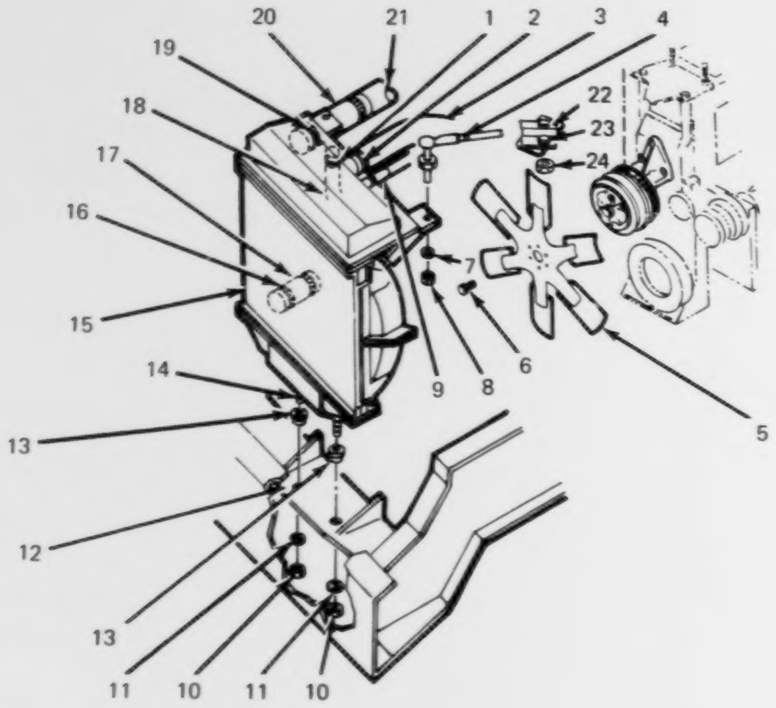
Follow-on maintenance actions required:

a. Install steering pump cooler hoses, para 10-22.
b. Install transmission cooler hoses, para 6-10C.
c. Install grille, para 11-16.
d. Install brush guard (M916/M920), para 11-16.
e. Fill cooling system, para 4-42C; use Artic Anti Freeze if sub zero.
f. Install hood, para 11-32C.

COOLING SYSTEM.

4-40. RADIATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. HOSE CLAMP
2. HOSE CLAMP
3. INLET HOSE
4. ROD ARM (2)
5. FAN
6. CAPSCREW (6)
7. WASHER (2)
8. NUT (2)
9. RADIATOR AERATION HOSE
10. NUT (2)
11. WASHER (2)
12. SUPPORT
13. INSULATOR (2)
14. MOUNTING STUD (2)
15. RADIATOR
16. HOSE CLAMP
17. OUTLET HOSE
18. PUMP AERATION HOSE
19. CLAMP (2)
20. BOOT
21. AIR FILTER INLET TUBE
22. CLAMP (2)
23. CLAMP BOLT (2)
24. NUT (2)

TA 075643

4-41. FAN SHROUDS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(30)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

None.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

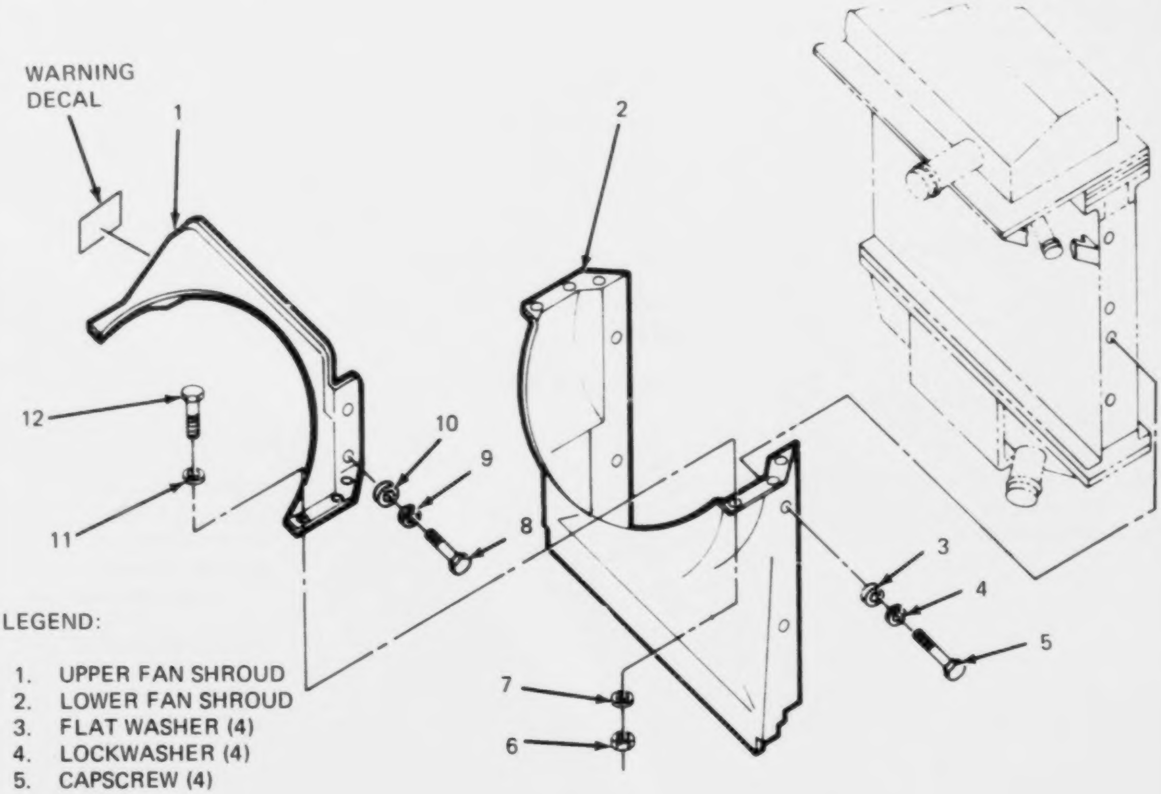
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-41. FAN SHROUDS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six capscrews (12), nuts (6), and twelve washers (7) and (11).	Unscrew and remove.	
2. Four capscrews (8), flat washers (10), and lock washers (9).	Unscrew and remove.	



LEGEND:

1. UPPER FAN SHROUD
2. LOWER FAN SHROUD
3. FLAT WASHER (4)
4. LOCKWASHER (4)
5. CAPSCREW (4)
6. NUT (6)
7. FLAT WASHER (6)
8. CAPSCREW (4)
9. LOCKWASHER (4)
10. FLAT WASHER (4)
11. FLAT WASHER (6)
12. CAPSCREW (6)

TA 074663

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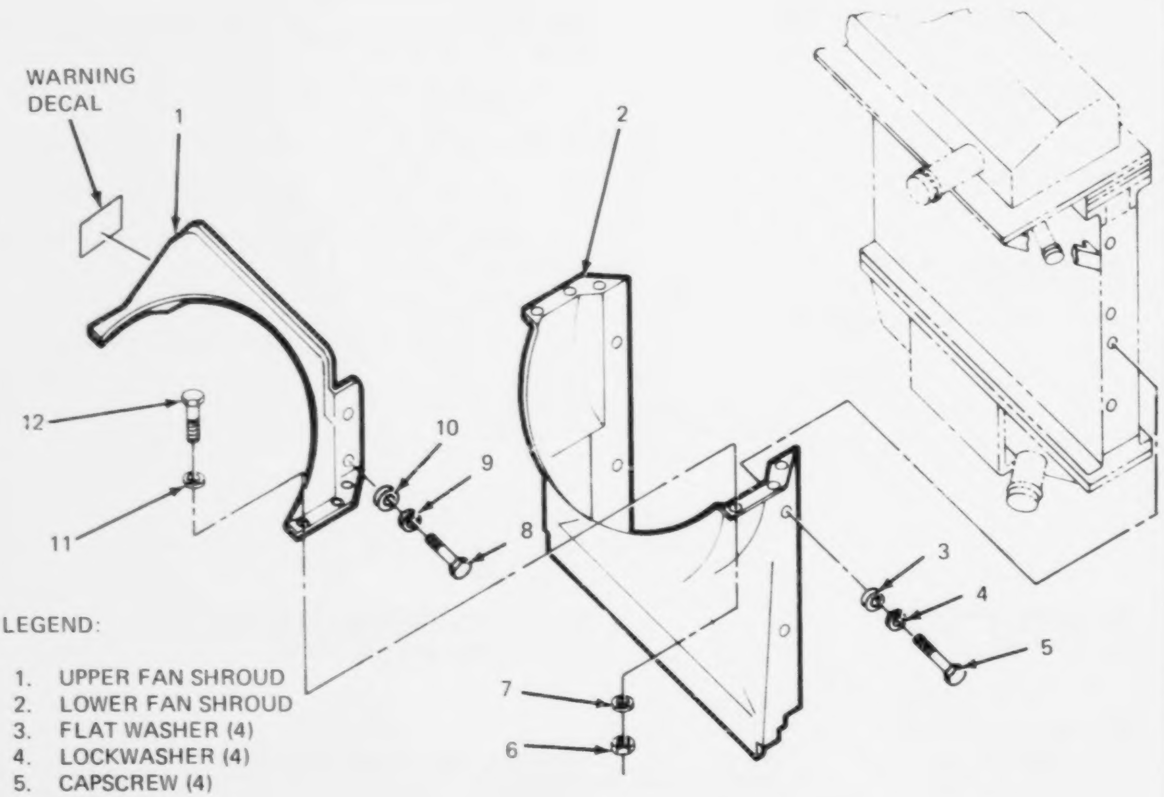
4-41. FAN SHROUDS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Upper fan shroud (1).	a. Remove. b. Remove fan (refer to para 4-4A).	
4. Four capscrews (5), lockwashers (4) and flat washers (3).	Unscrew and remove.	
5. Lower fan shroud (2).	Remove.	
B. INSTALLATION.		
6. Lower fan shroud (2).	a. Set in place and attach with four capscrews (5), lockwashers (4), and flat washers (3). b. Install fan (refer to para 4-4B).	
7. Upper fan shroud (1).	Set in place and attach with four capscrews (8), flat washers (10), and lockwashers (9).	
8. Six capscrews (12), nuts (6), and twelve washers (7) and (11).	Screw on and tighten.	
9. Eight capscrews (5) and (8), lockwashers (4) and (9), and flat washers (3) and (10).	Tighten.	

4-41. FAN SHROUDS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. UPPER FAN SHROUD
2. LOWER FAN SHROUD
3. FLAT WASHER (4)
4. LOCKWASHER (4)
5. CAPSCREW (4)
6. NUT (6)
7. FLAT WASHER (6)
8. CAPSCREW (4)
9. LOCKWASHER (4)
10. FLAT WASHER (4)
11. FLAT WASHER (6)
12. CAPSCREW (6)

TA 074664

4-42. COOLANT SYSTEM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Drain.	(21)
b. Inspection/Installation of Draincocks.	(1)
c. Replenishing Coolant.	(10)
d. Checking for Leaks.	(5)
	37 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container(s) (60 qt min).
Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-42. COOLANT SYSTEM MAINTENANCE (Continued).

NOTE

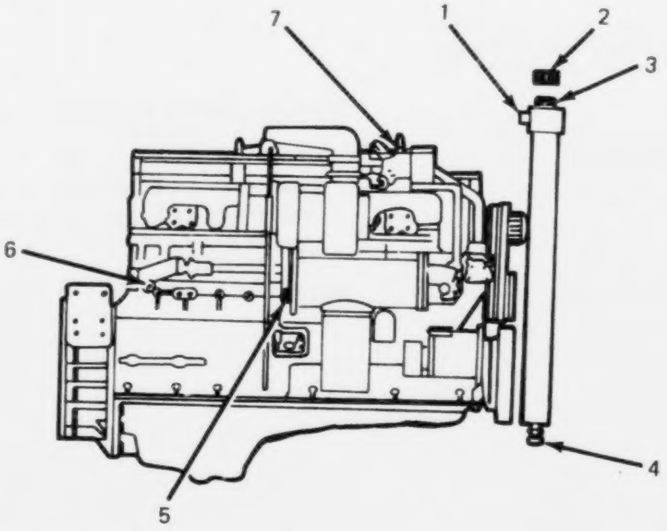
Before opening each drain cock, place container underneath to catch coolant.

A. DRAIN.

LOCATION/ITEM	ACTION	REMARKS
1. Radiator cap (2).	Remove.	
2. Radiator draincock (4).	Open and let coolant drain out.	
3. Thermostat petcock (7).	Open.	
4. Oil cooler draincock (5).	a. Open. b. Let coolant drain out. c. Close.	
5. Ether quick-start sending unit (6).	a. Disconnect wire. b. Remove ether quick-start sending unit and clean threads. c. Allow coolant to drain out. d. Apply liquid teflon to threads and install ether quick-start sending unit.	

LEGEND:

1. SIGHT GLASS
2. RADIATOR CAP
3. RADIATOR FILL NECK
4. RADIATOR DRAINCOCK
5. OIL COOLER DRAINCOCK
6. ETHER QUICK-START SENDING UNIT
7. THERMOSTAT PETCOCK



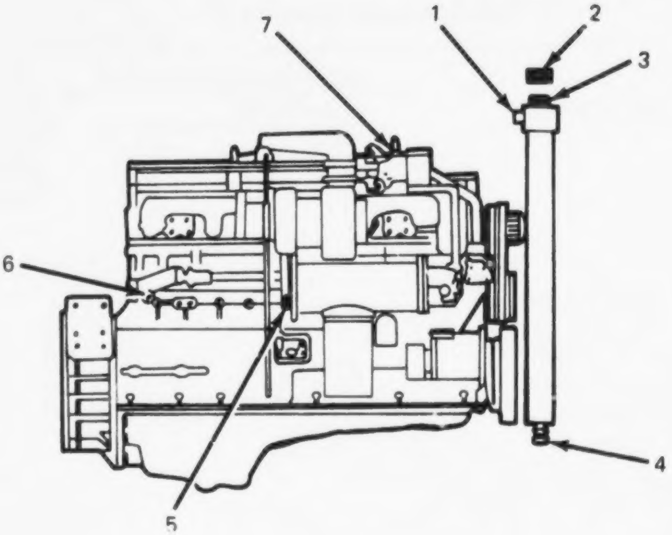
TA 074665

4-42. COOLANT SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION/INSTALLATION OF DRAINCOCKS.		
6. Radiator draincock (4), oil cooler draincock (5) and thermostat petcock (7).	a. Remove as required. b. Inspect for damage. c. Coat threads with liquid teflon. d. Screw into place and close.	
C. REPLENISHING COOLANT.		
	NOTE Fill with Artic Anti Freeze if sub-zero	
7. Radiator fill neck (3).	Add coolant until thermostat petcock (7) overflows.	
8. Thermostat petcock (7).	Close.	
9. Radiator fill neck (3).	Continue adding coolant until sight glass (1) is filled.	
D. CHECKING FOR LEAKS.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Coolant system.	a. Check for leaks. b. Make sure coolant level is to the top of sight glass (1).	 Add more if needed.
12. Radiator cap (2).	Install.	

4-42. COOLANT SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SIGHT GLASS
2. RADIATOR CAP
3. RADIATOR FILL NECK
4. RADIATOR DRAINCOCK
5. OIL COOLER DRAINCOCK
6. ETHER QUICK-START SENDING UNIT
7. THERMOSTAT PETCOCK

TA 074666

4-43. THERMOSTAT AND HOUSING MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Testing.	(10)
c. Installation.	(30)
d. Operational Check.	(15)
	75 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Thermostat Seal Mandrel, ST-1225 (15434).

MATERIALS/PARTS (P/N)

Gasket (6620-00-047-2811).
Rubber Seal (5330-00-864-5422).
Gasket, 210859 (15434).
Container(s) for Coolant.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Cooling System Drained Below Thermostat Housing.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

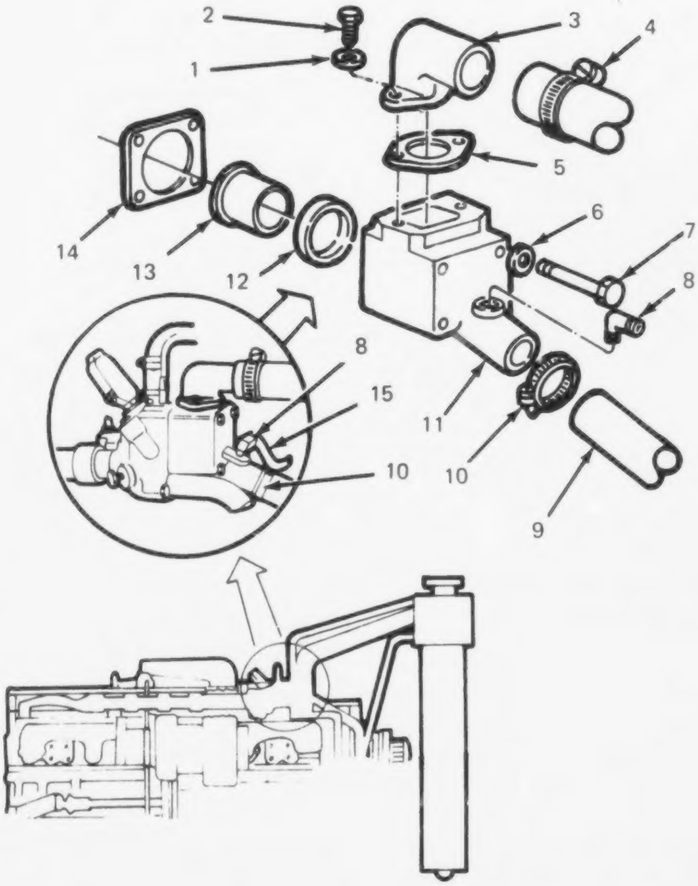
4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Bypass hose clamp (4), radiator inlet hose clamp (10), and hose (9).	Loosen and remove hoses.	
2. Compressor coolant line (15).	Unscrew from fitting (8).	

LEGEND:

1. WASHER
2. CAPSCREW
3. ELBOW
4. BYPASS HOSE CLAMP
5. GASKET
6. WASHER (4)
7. CAPSCREW (4)
8. FITTING
9. HOSE
10. RADIATOR INLET HOSE CLAMP
11. THERMOSTAT HOUSING
12. RUBBER SEAL
13. THERMOSTAT
14. GASKET
15. COMPRESSOR COOLANT LINE



TA 074667

COOLING SYSTEM.

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

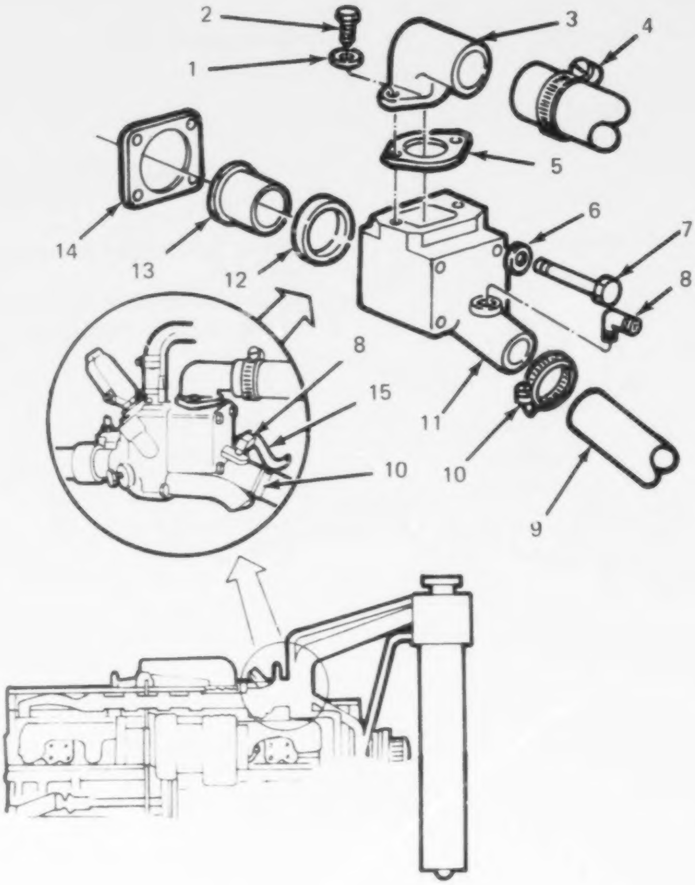
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two capscrews (2), and washers (1).	Unscrew and remove.	
4. Elbow (3) and gasket (5).	a. Remove. b. Check elbow for cracks.	
5. Four capscrews (7) and washers (6).	Unscrew and remove.	
6. Thermostat housing (11).	a. Tap with soft head hammer and remove. b. Check housing for: 1. Cracks. 2. Damaged fittings. 3. Stains from leaks.	Replace if necessary.
7. Gasket (14), thermostat (13), and rubber seal (12).	Remove.	
B. TESTING.		
8. Thermostat (13).	a. Check that at room temperature thermostat is closed. b. Put thermostat in hot water. When temperature reaches 185°F (85°C) thermostat should open.	If thermostat does not work, replace it.
C. INSTALLATION.		
9. Thermostat (13), gasket (14), and rubber seal (12).	Install rubber seal (12) in thermostat housing (11) using thermostat seal mandrel. Install thermostat (13), new gasket (14), and secure with four capscrews (7), and washers (6).	Seal must be installed with part number or metal flange of seal toward mandrel to ensure proper sealing.
10. Gasket (5), elbow (3), washer (1), and capscrew (2).	Secure new gasket (5), and elbow (3), with two capscrews (2), and washer s (1).	
11. Compressor coolant line (15).	Screw to fitting (8).	

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. WASHER
2. CAPSCREW
3. ELBOW
4. BYPASS HOSE CLAMP
5. GASKET
6. WASHER (4)
7. CAPSCREW (4)
8. FITTING
9. HOSE
10. RADIATOR INLET HOSE CLAMP
11. THERMOSTAT HOUSING
12. RUBBER SEAL
13. THERMOSTAT
14. GASKET
15. COMPRESSOR COOLANT LINE



TA 074668

COOLING SYSTEM.

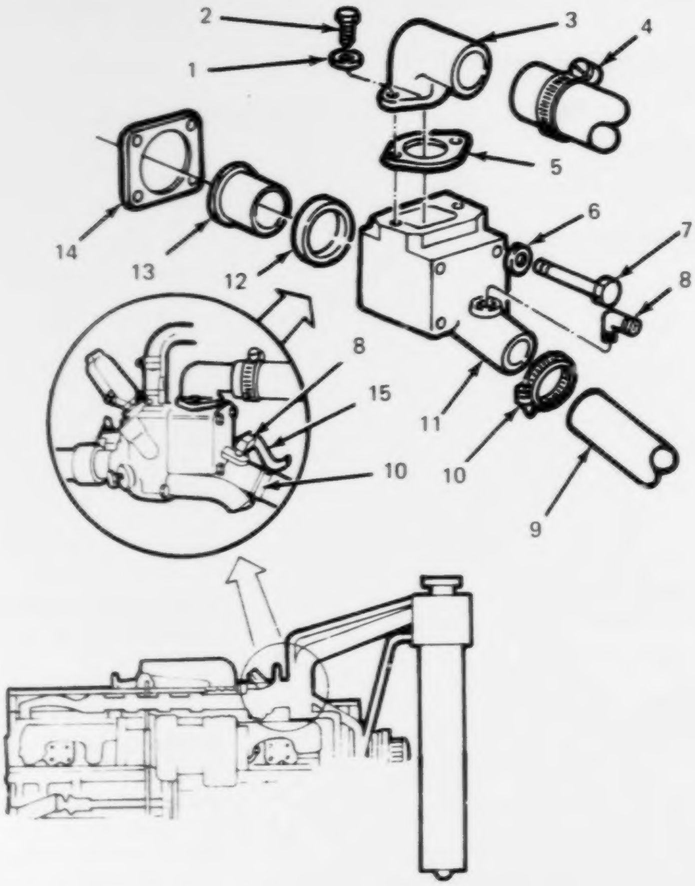
4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
12. Bypass hose clamp (4), radiator inlet hose clamp (10) and hose (9).	Install hoses to thermostat housing (11).	
13. Fill cooling system.	Refer to para 4-42C.	
D. OPERATIONAL CHECK.		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. Cooling system.	a. Check for leaks at thermostat housing. b. Make sure coolant is to the top of the radiator sight glass.	

COOLING SYSTEM.

4-43. THERMOSTAT AND HOUSING MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. WASHER
2. CAPSCREW
3. ELBOW
4. BYPASS HOSE CLAMP
5. GASKET
6. WASHER (4)
7. CAPSCREW (4)
8. FITTING
9. HOSE
10. RADIATOR INLET HOSE CLAMP
11. THERMOSTAT HOUSING
12. RUBBER SEAL
13. THERMOSTAT
14. GASKET
15. COMPRESSOR COOLANT LINE

TA 075644

COOLING SYSTEM.

4-44. FAN MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b, Installation.	(15)
c. Operational Check.	(2)
	32 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-41A.	Upper Fan Shroud Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

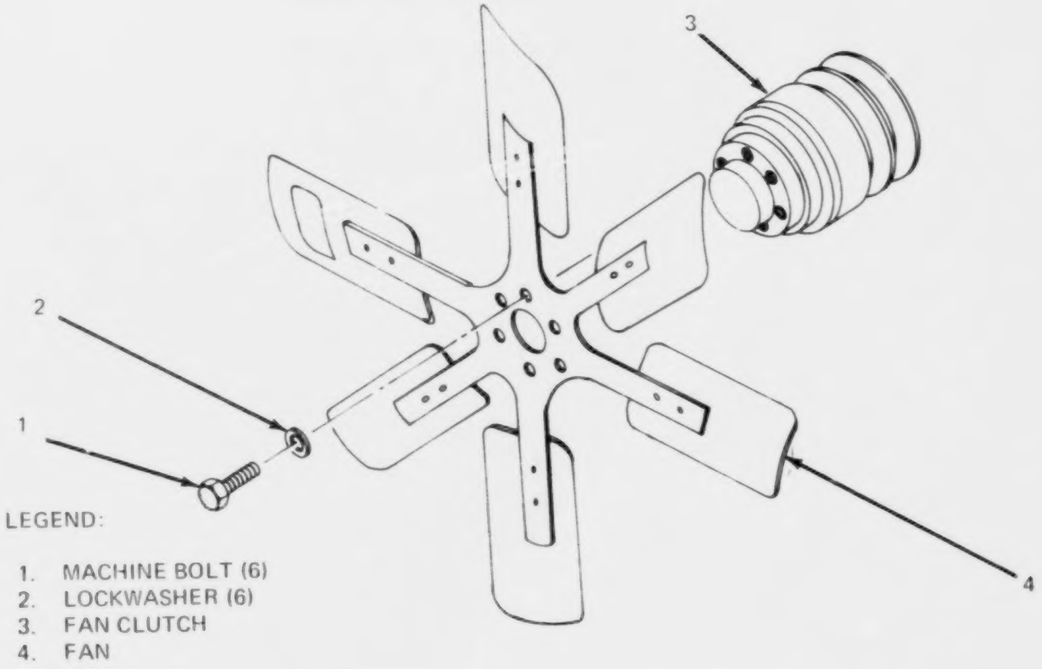
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Fan Clutch May Engage at any Time When Engine is Running.

4-44. FAN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six machine bolts (1) and lockwashers (2).	Unscrew and remove.	
2. Fan (4).	Remove from fan clutch (3) and lay in lower fan shroud.	
3. Fan clutch (3).	Remove	Refer to para 4-45A.
4. Fan (4).	Remove from lower fan shroud.	



LEGEND:

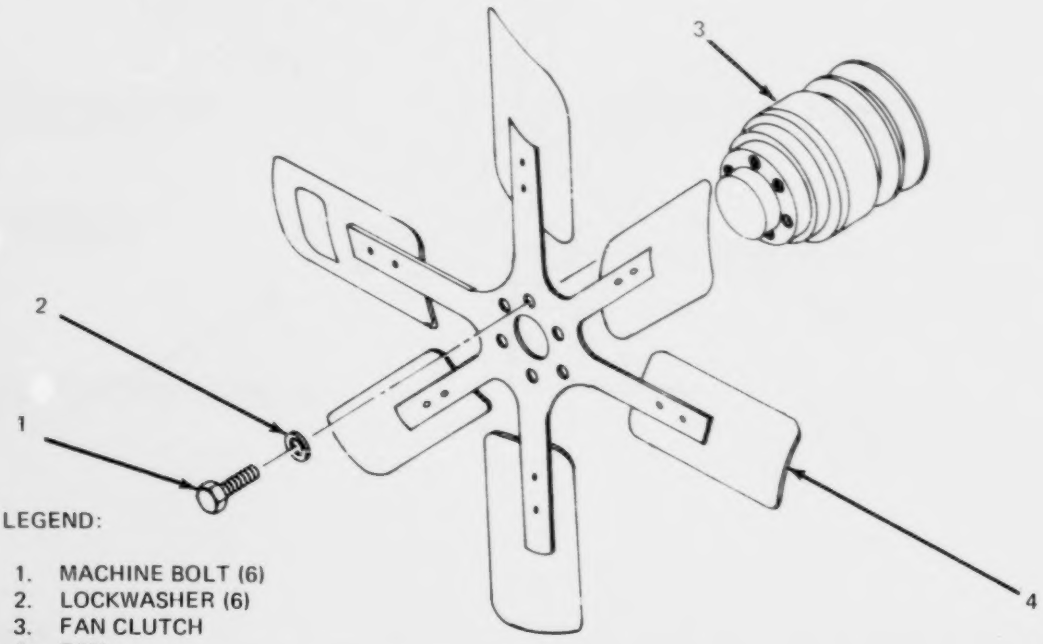
1. MACHINE BOLT (6)
2. LOCKWASHER (6)
3. FAN CLUTCH
4. FAN

TA 074669

COOLING SYSTEM.

4-44. FAN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Fan (4).	Set in lower fan shroud.	
6. Fan clutch (3).	Install.	Refer to para 4-45 C & D.
7. Fan (4), six machine bolts (1), and lockwashers (2).	a. Mount on fan clutch (3). b. Tighten machine bolts to 25-31 lb-ft (34-42 N·m).	Numbers on fan blade must face radiator.
8. Upper fan shroud.	Reinstall.	Refer to para 4-41 B.
C. OPERATIONAL CHECK.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Fan (4).	With engine running, make sure that fan draws air from radiator.	
11. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. MACHINE BOLT (6)
2. LOCKWASHER (6)
3. FAN CLUTCH
4. FAN

TA 074670

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4-45. FAN CLUTCH AND BELTS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection.	(5)
c. Installation.	(5)
d. Adjustment.	(15)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
Belt Tension Gage.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-41A.	Upper Fan Shroud Removed.

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCE (TM)
None.

TROUBLESHOOTING REFERENCES
None.

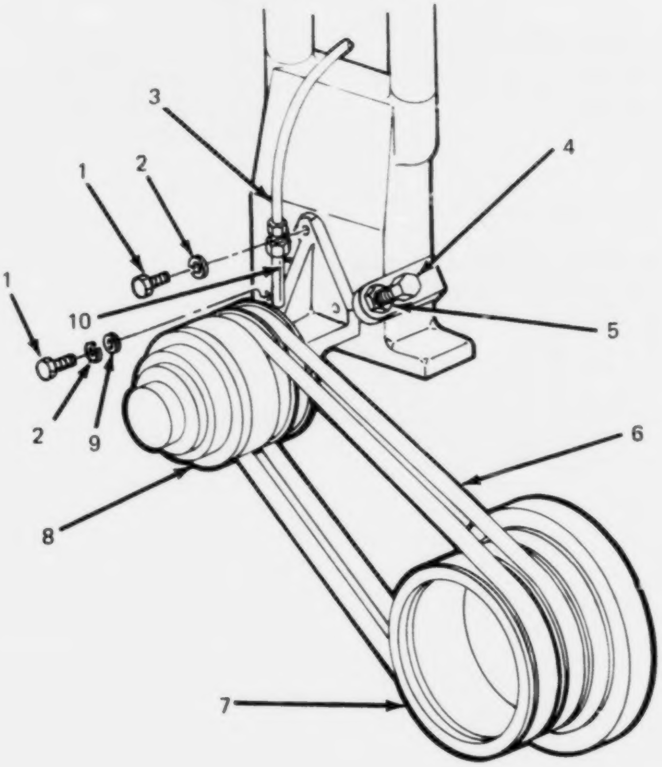
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.
Fan Clutch May engage at any Time Engine is Running.

COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Fan.	Remove from fan clutch (8) and set in lower fan shroud.	Refer to para 4-44 A.
2. Three machine bolts (1).	Loosen.	
3. Two fan belts (6).	Remove by loosening locknut (5) and adjusting screw (4).	
4. Actuator outlet line (3).	Loosen and remove from fan clutch (8).	
5. Three machine bolts (1), three lockwashers (2), two flat washers (9), and fan clutch (8).	Remove.	Flat washers (9) are used with the two lower machine bolts (1).



LEGEND:

1. MACHINE BOLT (3)
2. LOCKWASHER (3)
3. ACTUATOR OUTLET LINE
4. ADJUSTING SCREW
5. LOCKNUT
6. FAN BELTS (2)
7. ACCESSORY DRIVE PULLEY
8. FAN CLUTCH
9. FLAT WASHER (2)
10. FAN LOCKUP SCREW

TA 074671

COOLING SYSTEM.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

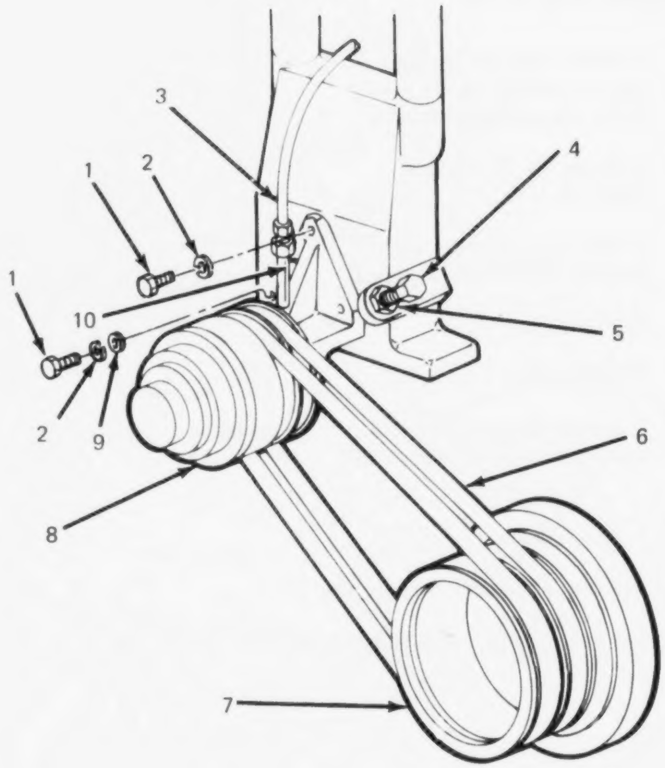
LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
6. Actuator outlet line (3).	Check for: a. Leaks. b. Kinks. c. Cracks. d. Damaged threads.	Replace if necessary.
7. Two fan belts (6).	Check for: a. Cuts. b. Wear.	Replace if necessary. Belts must be replaced as a matched set.
C. INSTALLATION.		
8. Fan clutch (8), three machine bolts (1), three lockwashers (2), and two flat washers (9).	Install; hand tighten machine bolts (1).	Be sure fan lockup screw (10) is backed out. Flat washers (9) are used with the two lower machine bolts (1).
9. Two fan belts (6).	Install over fan clutch (8) and accessory drive pulley (7).	Rotate fan clutch (8) toward accessory drive pulley (7) for ease of installation.

CAUTION

Fan lockup screw (10) should not be used unless clutch stops functioning and engine begins to overheat.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. MACHINE BOLT (3)
2. LOCKWASHER (3)
3. ACTUATOR OUTLET LINE
4. ADJUSTING SCREW
5. LOCKNUT
6. FAN BELTS (2)
7. ACCESSORY DRIVE PULLEY
8. FAN CLUTCH
9. FLAT WASHER (2)
10. FAN LOCKUP SCREW

TA 074672

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

D. ADJUSTMENT.

NOTE

Use belt tension gage to check tension. It should be 120 lb-ft (162 N·m) for new belts or 100 lb-ft (136 N·m) for used belts. Used belts have more than one thousand miles of use.

LOCATION/ITEM	ACTION	REMARKS
10. Adjusting screw (4), locknut (5) and fan belts (6).	Loosen locknut (5) and adjust tension as necessary with adjusting screw (4).	
11. Three machine bolts (1).	Tighten to 70-85 lb-ft (95-115 N·m).	
12. Two fan belts (6).	Check that tension is the same as described in step 9.	
13. Locknut (5).	Tighten securely.	
14. Actuator outlet line (3).	Install on fan clutch (8).	
15. Fan.	Lift from lower fan shroud and install to fan clutch (8).	Refer to para 4-44 B.

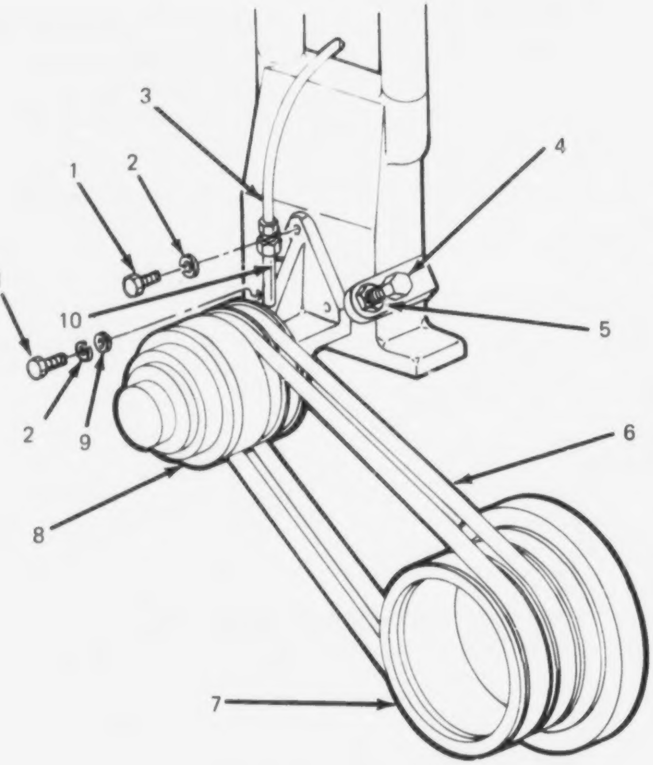
NOTE

Follow-on maintenance action required:

Install upper fan shroud; refer to para 4-41 B.

4-45. FAN CLUTCH AND BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. MACHINE BOLT (3)
2. LOCKWASHER (3)
3. ACTUATOR OUTLET LINE
4. ADJUSTING SCREW
5. LOCKNUT
6. FAN BELTS (2)
7. ACCESSORY DRIVE PULLEY
8. FAN CLUTCH
9. FLAT WASHER (2)
10. FAN LOCKUP SCREW

TA 075645

COOLING SYSTEM.

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917 AND M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspect Air Lines.	(5)
c. Installation.	(15)
d. Operational Check.	(10)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
M915, M916, M917, M918, M920.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Coolant Drained Below Fan Clutch Actuator.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCE (TM)
TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES
Table 4-1.

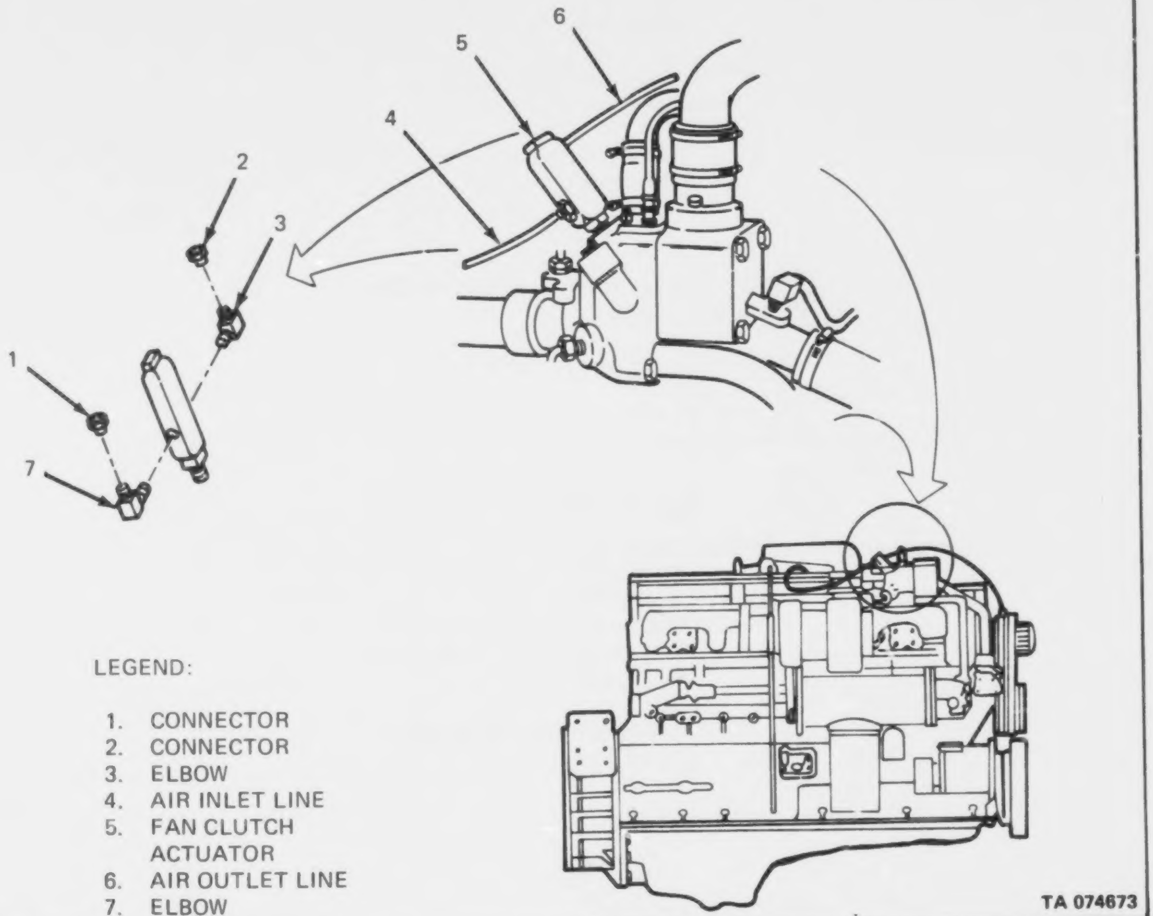
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.
Fan Clutch May Engage at Any Time Engine is Running.

COOLING SYSTEM.

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 AND M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air inlet line (4).	Disconnect connector (1) and remove air inlet line (4) from fan clutch actuator (5).	
2. Air outlet line (6).	Disconnect connector (2) and remove air outlet line (6) from fan clutch actuator (5).	
3. Fan clutch actuator (5).	Unscrew and remove.	Use crows foot wrench, if necessary.
4. Elbows (3) and (7).	Unscrew and remove.	



LEGEND:

1. CONNECTOR
2. CONNECTOR
3. ELBOW
4. AIR INLET LINE
5. FAN CLUTCH ACTUATOR
6. AIR OUTLET LINE
7. ELBOW

TA 074673

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 & M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECT AIR LINES.		
5. Air inlet (4) and outlet (6) lines.	a. Inspect lines for: 1. Cracks. 2. Kinks.	Replace, if necessary.
	b. Inspect elbows and connectors for: 1. Cracks. 2. Bends.	Replace, if necessary.
C. INSTALLATION.		
6. Fan clutch actuator (5).	Coat threads with liquid teflon, screw in.	
7. Elbows (3) and (7).	Coat threads with liquid teflon, screw in.	
8. Air outlet line (6).	Screw connector (2) into side marked OUTLET.	
9. Air inlet line (4).	Screw connector (1) into side marked INLET.	

NOTE

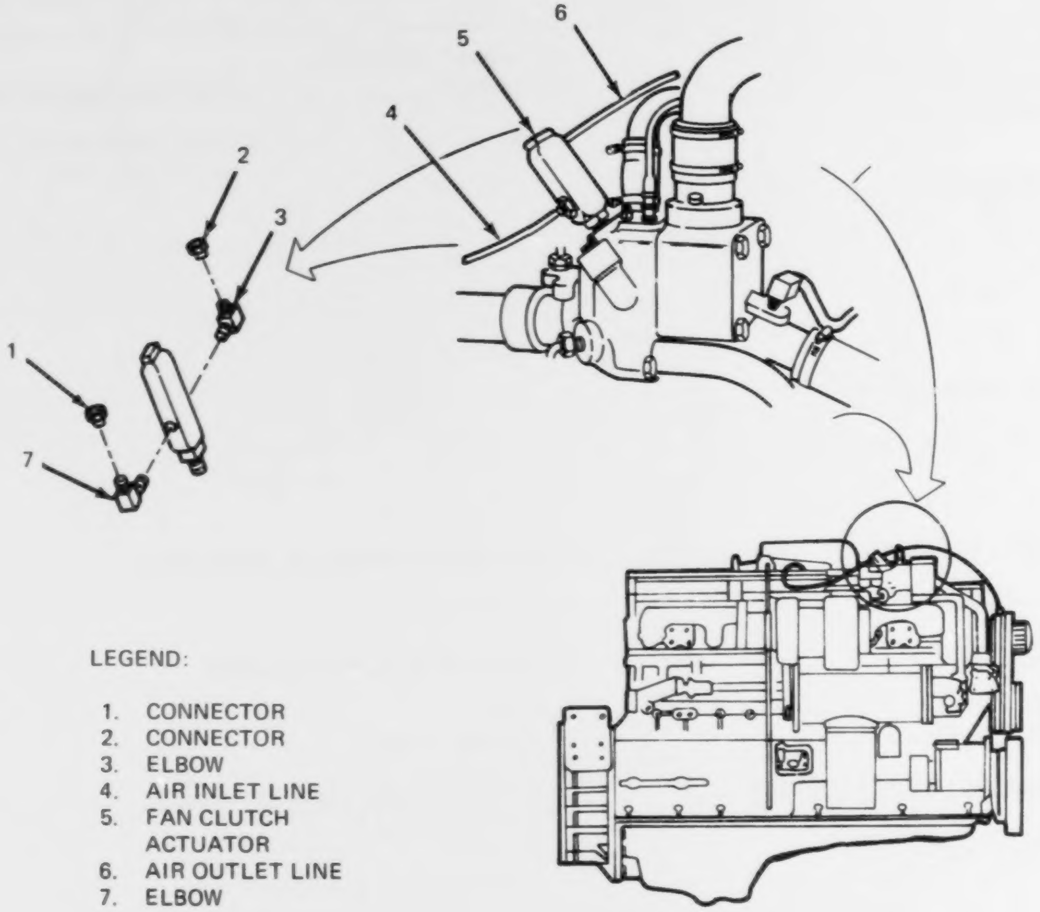
Follow-on maintenance required before operational check:

Refill radiator; refer to para 4-42C.

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Fan.	Observe that fan begins to operate when engine water temperature (gage on instrument panel in cab) rises above 190°F, (88°C).	
12. Engine.	Shut down (see TM 9-2320-273-10).	

4-46. FAN CLUTCH ACTUATOR MAINTENANCE (M915, M916, M917, M918 & M920) (Continued)

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CONNECTOR
2. CONNECTOR
3. ELBOW
4. AIR INLET LINE
5. FAN CLUTCH ACTUATOR
6. AIR OUTLET LINE
7. ELBOW

TA 074674

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Insection of Air Tubes.	(5)
c. Installation.	(15)
d. Operational Check.	(10)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M919.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Coolant Drained Below Fan Clutch Actuator Level.

SPECIAL ENVIRONMENTAL CONDITIONS

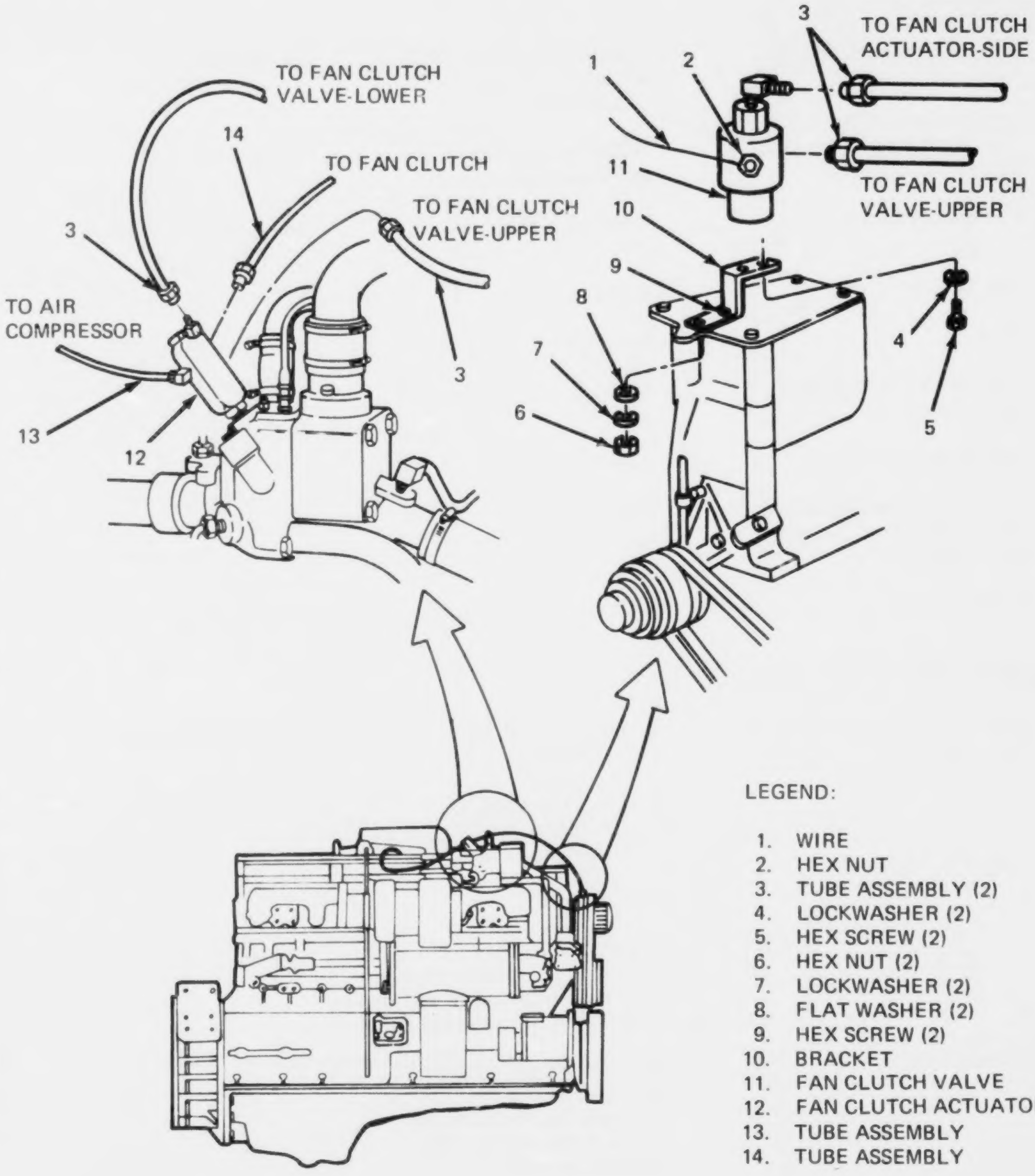
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.
Fan Clutch May Engage at Any Time Engine is Running.

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).


TO FAN CLUTCH VALVE-LOWER
14
TO FAN CLUTCH
3
TO FAN CLUTCH VALVE-UPPER
TO AIR COMPRESSOR
3
13
12
3
TO FAN CLUTCH ACTUATOR-SIDE
1
2
11
TO FAN CLUTCH VALVE-UPPER
10
9
8
7
6
4
5

LEGEND:

1. WIRE
2. HEX NUT
3. TUBE ASSEMBLY (2)
4. LOCKWASHER (2)
5. HEX SCREW (2)
6. HEX NUT (2)
7. LOCKWASHER (2)
8. FLAT WASHER (2)
9. HEX SCREW (2)
10. BRACKET
11. FAN CLUTCH VALVE
12. FAN CLUTCH ACTUATOR
13. TUBE ASSEMBLY
14. TUBE ASSEMBLY

TA 075646

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two tube assemblies (3).	Disconnect at fan clutch actuator (12) and fan clutch valve (11).	Tag for location.
2. Two tube assemblies (13) and (14).	Disconnect at fan clutch actuator (12).	Tag for location.
3. Fan clutch actuator (12).	Unscrew and remove.	Use crows foot wrench if necessary.
4. Hex nut (2).	Remove.	
5. Wire (1).	Remove.	
6. Two hex screws (5) and lockwashers (4).	Remove.	
7. Fan clutch valve (11).	Remove.	
8. Two hex screws (9), hex nuts (6), lockwashers (7), and flat washers (8).	Remove.	
9. Bracket (10).	Remove.	
B. INSPECTION OF AIR TUBES.		
10. Four tube assemblies (3), (13), and (14).	a. Inspect tubes for: 1. Cracks. 2. Kinks.	Replace if necessary.
	b. Inspect fittings for: 1. Cracks. 2. Bends.	Replace if necessary.

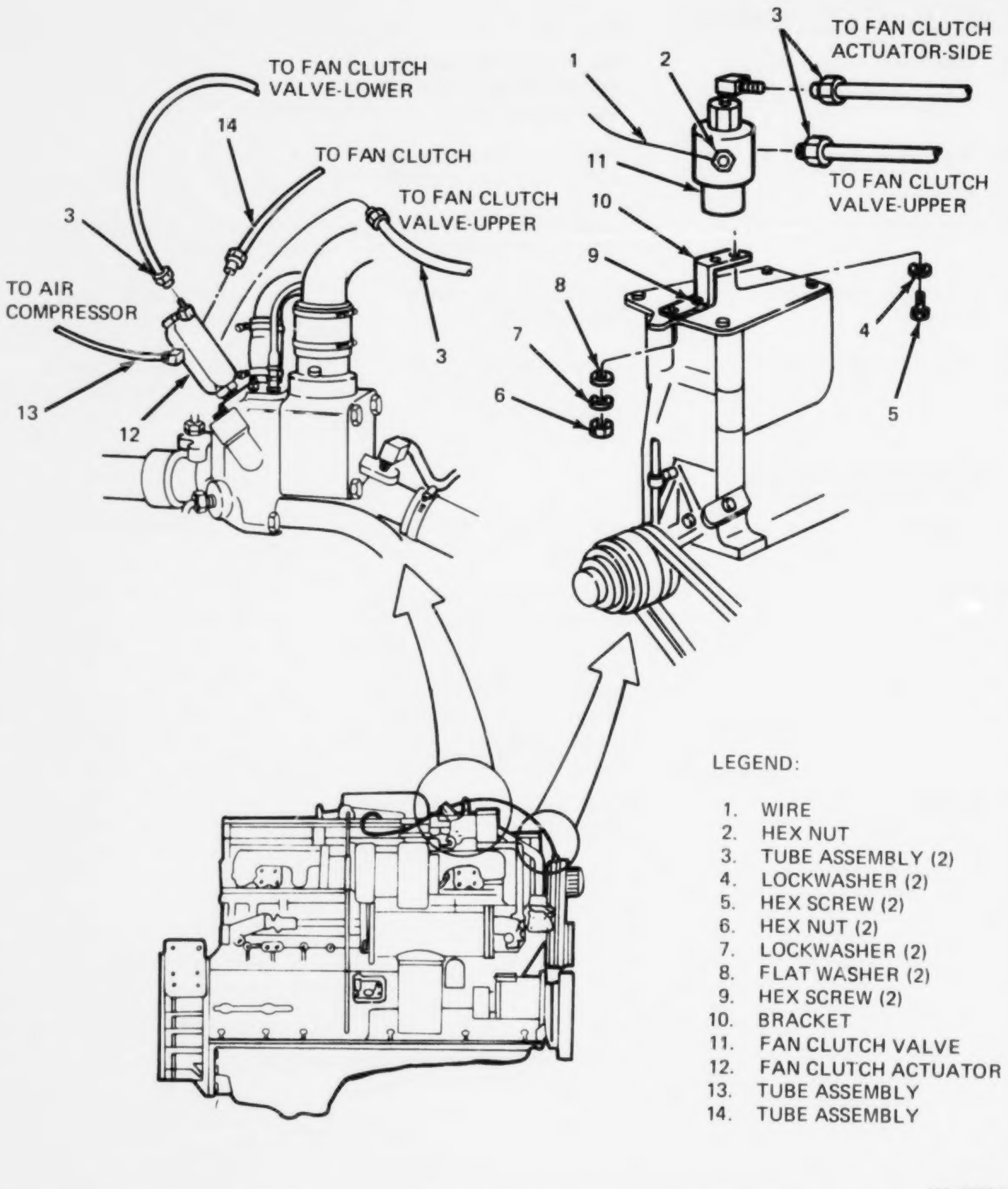
NOTE

If a new fan clutch actuator or fan clutch valve is being installed, transfer fittings from defective valve or actuator to the new one. Use liquid teflon on threaded connectons.

LOCATION/ITEM	ACTION	REMARKS
11. Bracket (10).	Set in place and secure with two hex screws (9), hex nuts (6), lockwashers (7), and flat washers (8). Tighten securely.	

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).


TO FAN CLUTCH VALVE-LOWER
14
TO FAN CLUTCH
TO FAN CLUTCH VALVE-UPPER
3
TO AIR COMPRESSOR
3
13
12
1
2
3
TO FAN CLUTCH ACTUATOR-SIDE
11
TO FAN CLUTCH VALVE-UPPER
10
9
8
7
6
4
5

LEGEND:

1. WIRE
2. HEX NUT
3. TUBE ASSEMBLY (2)
4. LOCKWASHER (2)
5. HEX SCREW (2)
6. HEX NUT (2)
7. LOCKWASHER (2)
8. FLAT WASHER (2)
9. HEX SCREW (2)
10. BRACKET
11. FAN CLUTCH VALVE
12. FAN CLUTCH ACTUATOR
13. TUBE ASSEMBLY
14. TUBE ASSEMBLY

TA 075647

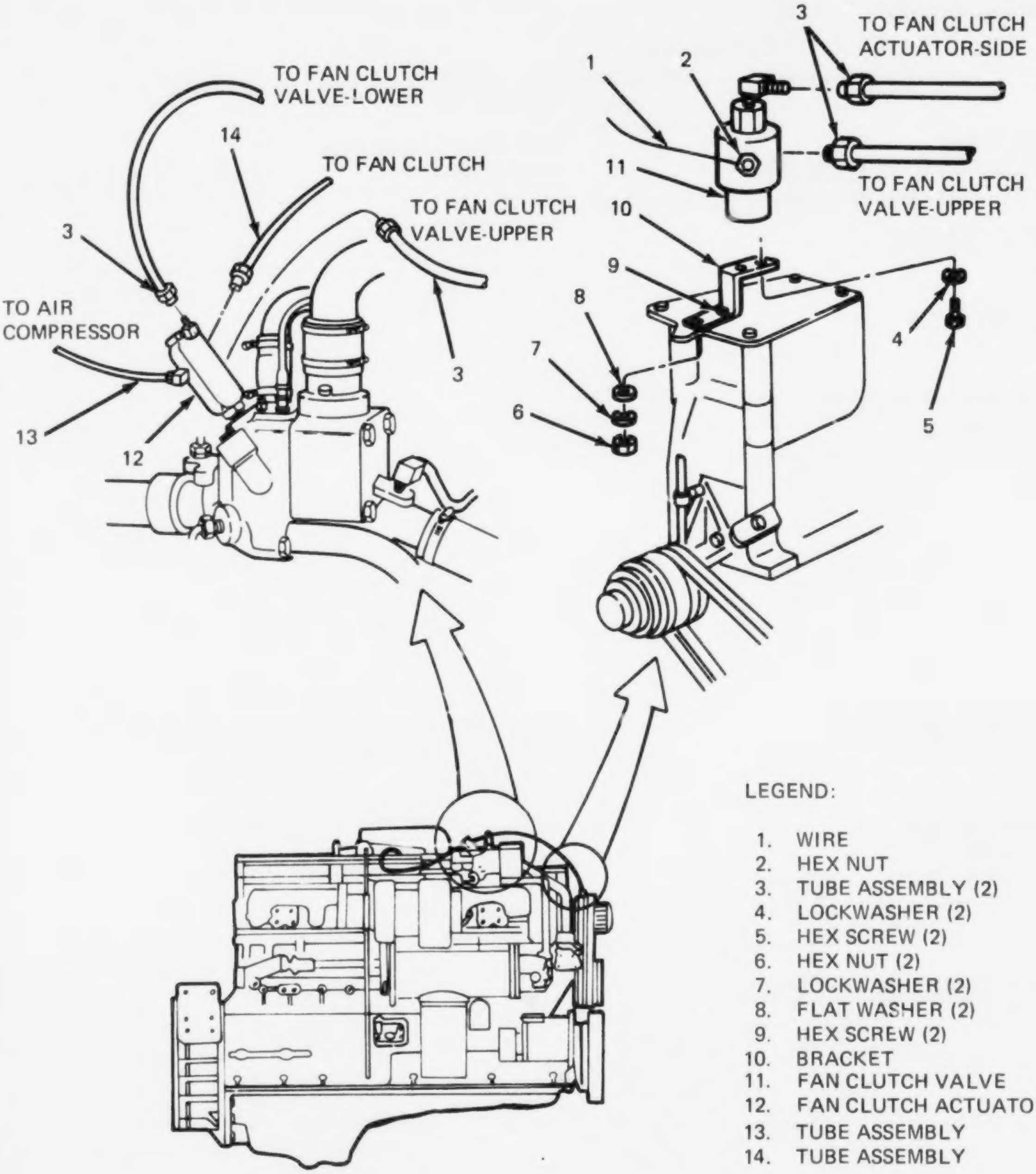
COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
12. Fan clutch valve (11).	Set in place and secure with two hex screws (5) and lockwashers (4).	
13. Wire (1).	Install over terminal and secure with hex nuts (2).	
14. Fan clutch actuator (12).	Coat threads with liquid teflon and screw in.	Tighten securely with crows foot wrench.
15. Two tube assemblies (13) and (14).	Connect at fan clutch actuator (12).	Note identification tagged for ease of installation.
16. Two tube assemblies (3).	Connect at fan clutch actuator (12) and fan clutch valve (11).	Note identification tagged for ease of installation.
D. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10).	
18. Fan.	Observe that fan begins to operate when engine water temperature (gage on instrument panel in cab) rises above 190°F (88°C) and/or when fan clutch valve switch is manually operated (see TM 9-2320-273-10).	
19. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM.

4-47. FAN CLUTCH ACTUATOR AND VALVE MAINTENANCE (M919) (Continued).


TO FAN CLUTCH VALVE-LOWER
14
TO FAN CLUTCH
TO FAN CLUTCH VALVE-UPPER
3
TO AIR COMPRESSOR
3
13
12
1
2
3
TO FAN CLUTCH ACTUATOR-SIDE
11
TO FAN CLUTCH VALVE-UPPER
10
9
8
7
6
4
5

LEGEND:

1. WIRE
2. HEX NUT
3. TUBE ASSEMBLY (2)
4. LOCKWASHER (2)
5. HEX SCREW (2)
6. HEX NUT (2)
7. LOCKWASHER (2)
8. FLAT WASHER (2)
9. HEX SCREW (2)
10. BRACKET
11. FAN CLUTCH VALVE
12. FAN CLUTCH ACTUATOR
13. TUBE ASSEMBLY
14. TUBE ASSEMBLY

TA 075648

COOLING SYSTEM.

4-48 FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 & M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Checking for Leaks.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, M918, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

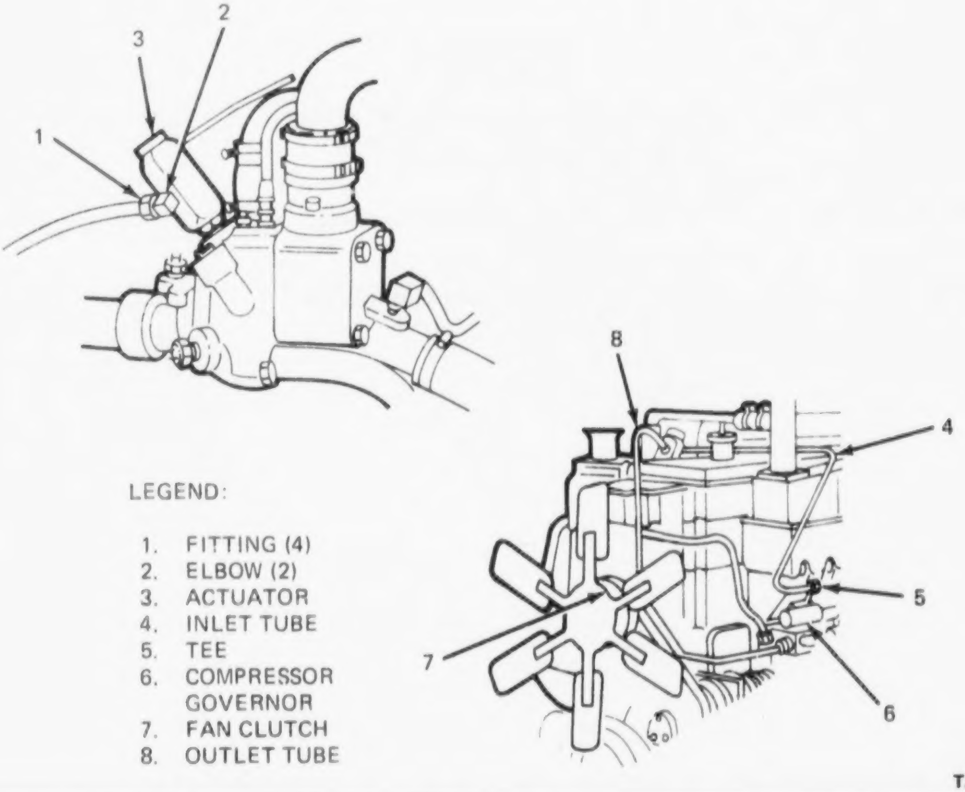
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 AND M920)(Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four fittings (1).	Unscrew from fan clutch (7), actuator (3) and tee (5) located on compressor governor (6).	Replace if necessary.
2. Two elbows (2).	Unscrew from fan clutch actuator (3).	Replace if necessary.
3. Inlet tube (4) and outlet tube (8).	a. Remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings. c. Blow gently through tubes to see that air flow is not blocked.	



LEGEND:

1. FITTING (4)
2. ELBOW (2)
3. ACTUATOR
4. INLET TUBE
5. TEE
6. COMPRESSOR GOVERNOR
7. FAN CLUTCH
8. OUTLET TUBE

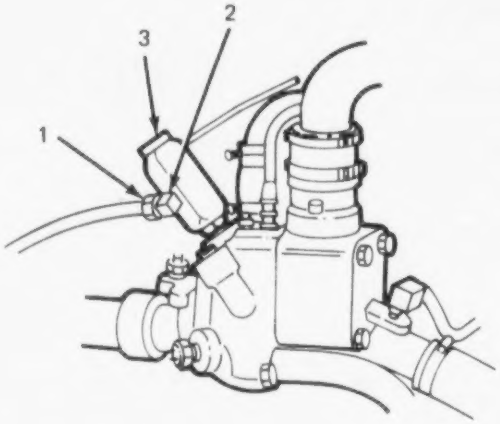
TA 074675

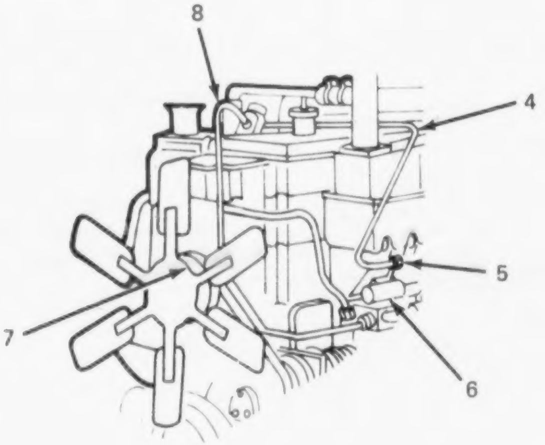
4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 AND M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Two elbows (2).	Coat threads with liquid teflon. Screw into fan clutch actuator.	
5. Two tubes (4) and (8).	a. Coat threads with liquid teflon. b. Screw four fittings (1) on fan clutch (7), actuator (3), and tee fitting (5) located on compressor governor (6). c. Tighten.	
C. CHECKING FOR LEAKS.		
6. Engine.	Start up (see TM 9-2320-273-10).	
	WARNING Be sure to stay completely clear of fan blades. Do not reach into fan clutch area while engine is operating.	
7. Tubes (4) and (8).	Use soap solution to check for leaks.	
8. Engine.	Shut down (see TM 9-2320-273-10).	

4-48. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M915, M916, M917, M918 & M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS





LEGEND:

1. FITTING (4)
2. ELBOW (2)
3. ACTUATOR
4. INLET TUBE
5. TEE
6. COMPRESSOR GOVERNOR
7. FAN CLUTCH
8. OUTLET TUBE

TA 074676

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection.	(5)
c. Installation.	(10)
d. Checking for Leaks.	(5)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M919.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.
Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

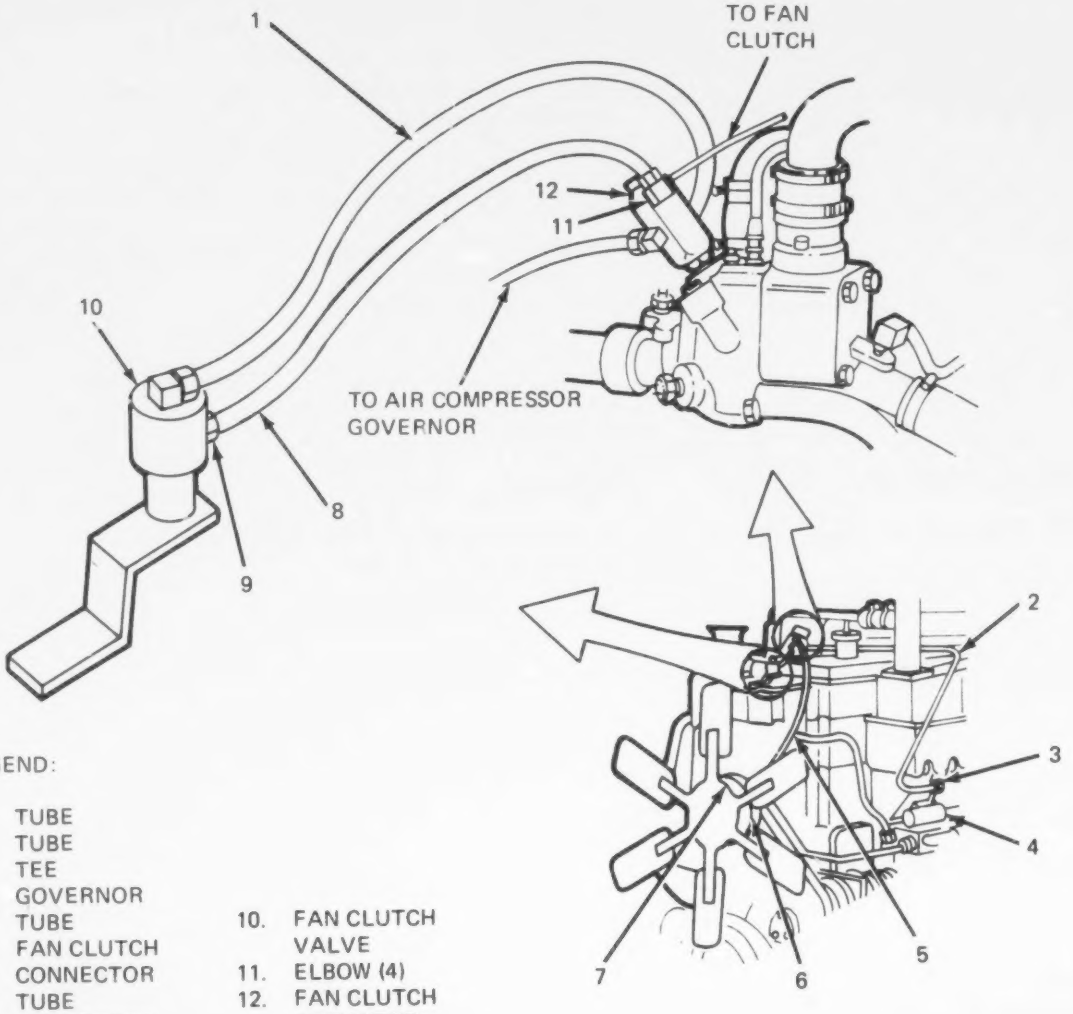
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
TO FAN CLUTCH
12
11
10
TO AIR COMPRESSOR GOVERNOR
8
9
2
3
4
7
6
5

LEGEND:

1. TUBE
2. TUBE
3. TEE
4. GOVERNOR
5. TUBE
6. FAN CLUTCH
7. CONNECTOR
8. TUBE
9. CONNECTOR
10. FAN CLUTCH VALVE
11. ELBOW (4)
12. FAN CLUTCH ACTUATOR

TA 075649

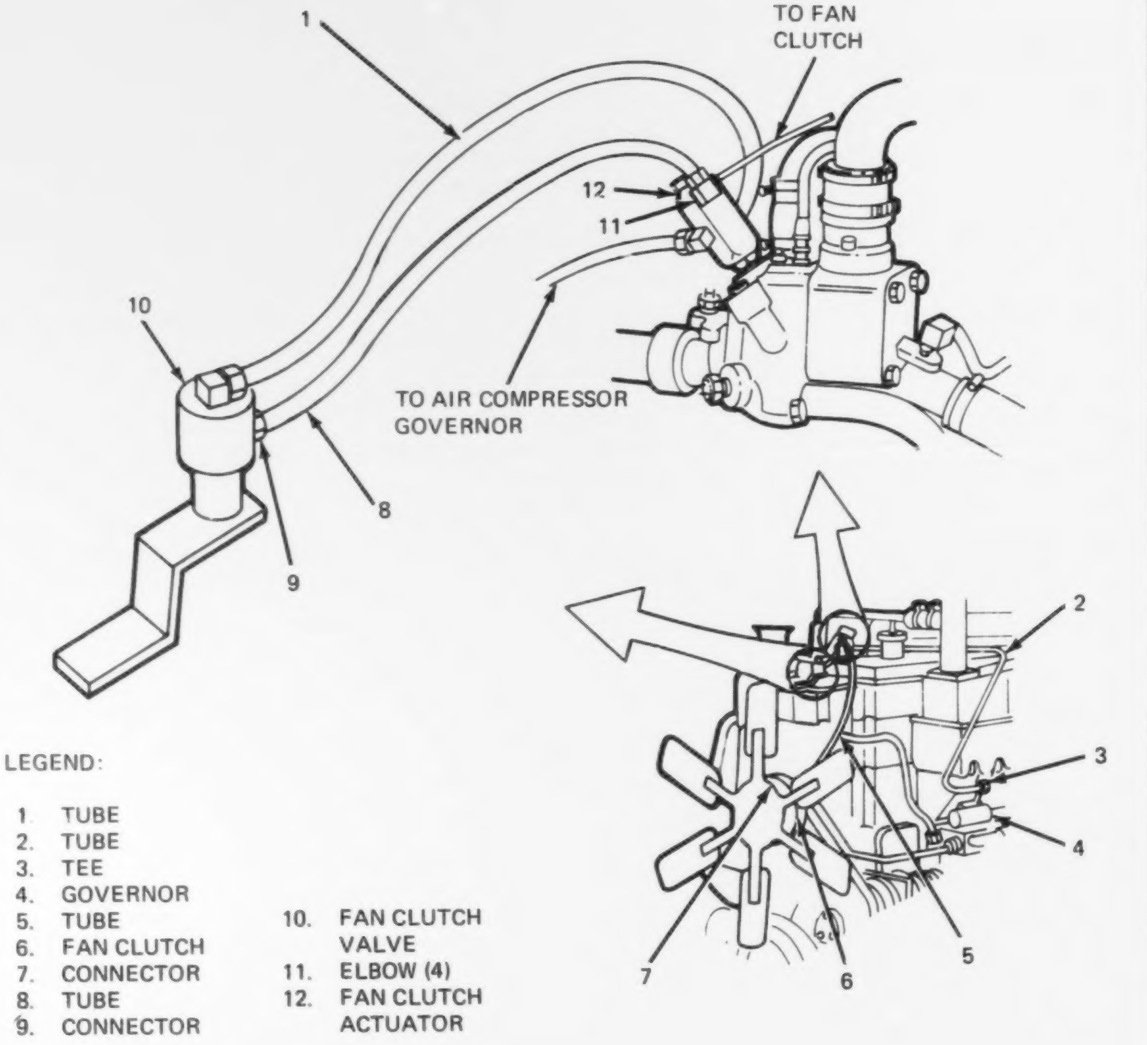
COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Tube (1).	Disconnect at fan clutch valve (10) and fan clutch actuator (12).	Tag for location.
2. Tube (2).	Disconnect at fan clutch actuator (12) and at governor (4).	Tag for location.
3. Tee (3).	Remove at governor (4).	
4. Tube (5).	Disconnect from connector (7) located on fan clutch and at fan clutch actuator (12).	Tag for location.
5. Tube (8).	Disconnect at fan clutch valve (10) and at fan clutch actuator (12).	Tag for location.
6. Connector (9).	Remove.	
7. Four elbows (11).	Remove one elbow (11) at fan clutch valve (10) and three elbows (11) at the fan clutch actuator (12).	

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS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TO FAN CLUTCH
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11
10
TO AIR COMPRESSOR GOVERNOR
8
9
2
3
4
7
6
5

LEGEND:

1. TUBE
2. TUBE
3. TEE
4. GOVERNOR
5. TUBE
6. FAN CLUTCH
7. CONNECTOR
8. TUBE
9. CONNECTOR
10. FAN CLUTCH VALVE
11. ELBOW (4)
12. FAN CLUTCH ACTUATOR

TA 075650

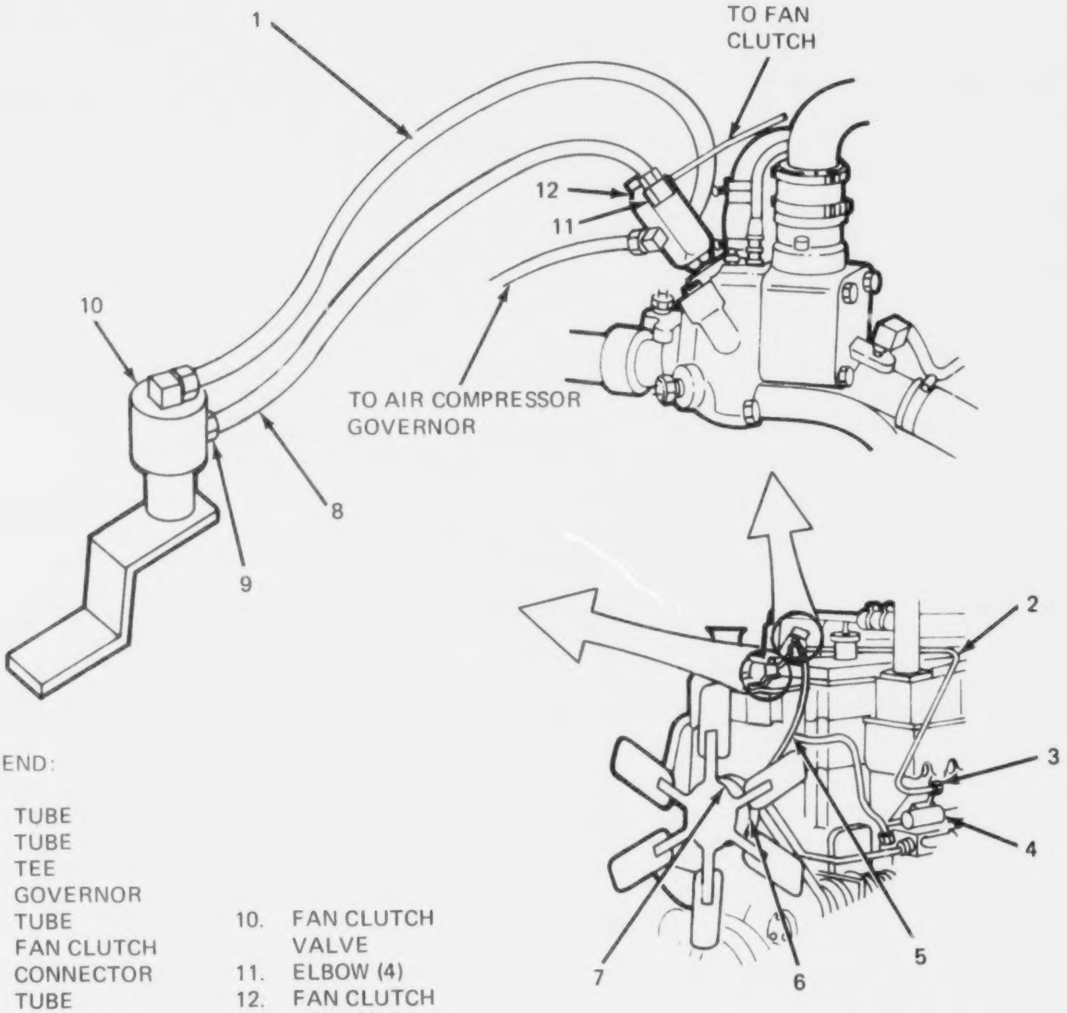
4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
8. Tubes and fittings.	Inspect all components for cracks and defects.	Replace if necessary.
C. INSTALLATION.		
9. Four elbows (11).	Install one elbow (11) at fan clutch valve (10) and three elbows (11) at the fan clutch actuator (12).	Coat threads with liquid teflon.
10. Connector (9).	Install in fan clutch valve (10).	Coat threads with liquid teflon.
11. Tube (8).	Connect at fan clutch valve (10) and at fan clutch actuator (12).	Coat threads with liquid teflon.
12. Tube (5).	Connect tube (5) to connector (7) located on fan clutch (6) and at fan clutch actuator (12).	Coat threads with liquid teflon.
13. Tee (3).	Install tee into governor (4).	Coat threads with liquid teflon.

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS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10
TO AIR COMPRESSOR GOVERNOR
8
9
2
3
4
5
6
7

LEGEND:

1. TUBE
2. TUBE
3. TEE
4. GOVERNOR
5. TUBE
6. FAN CLUTCH
7. CONNECTOR
8. TUBE
9. CONNECTOR
10. FAN CLUTCH VALVE
11. ELBOW (4)
12. FAN CLUTCH ACTUATOR

TA 075651

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919) (Continued).

C. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
14. Tube (2).	Connect at fan clutch actuator (12) and at tee (3).	Coat threads with liquid teflon.
15. Tube.	Connect at fan clutch actuator (12) and at fan clutch valve (10).	Coat threads with liquid teflon.

D. CHECKING FOR LEAKS.

LOCATION/ITEM	ACTION	REMARKS
16. Engine.	Start up (see TM 9-2320-273-10).	

WARNING

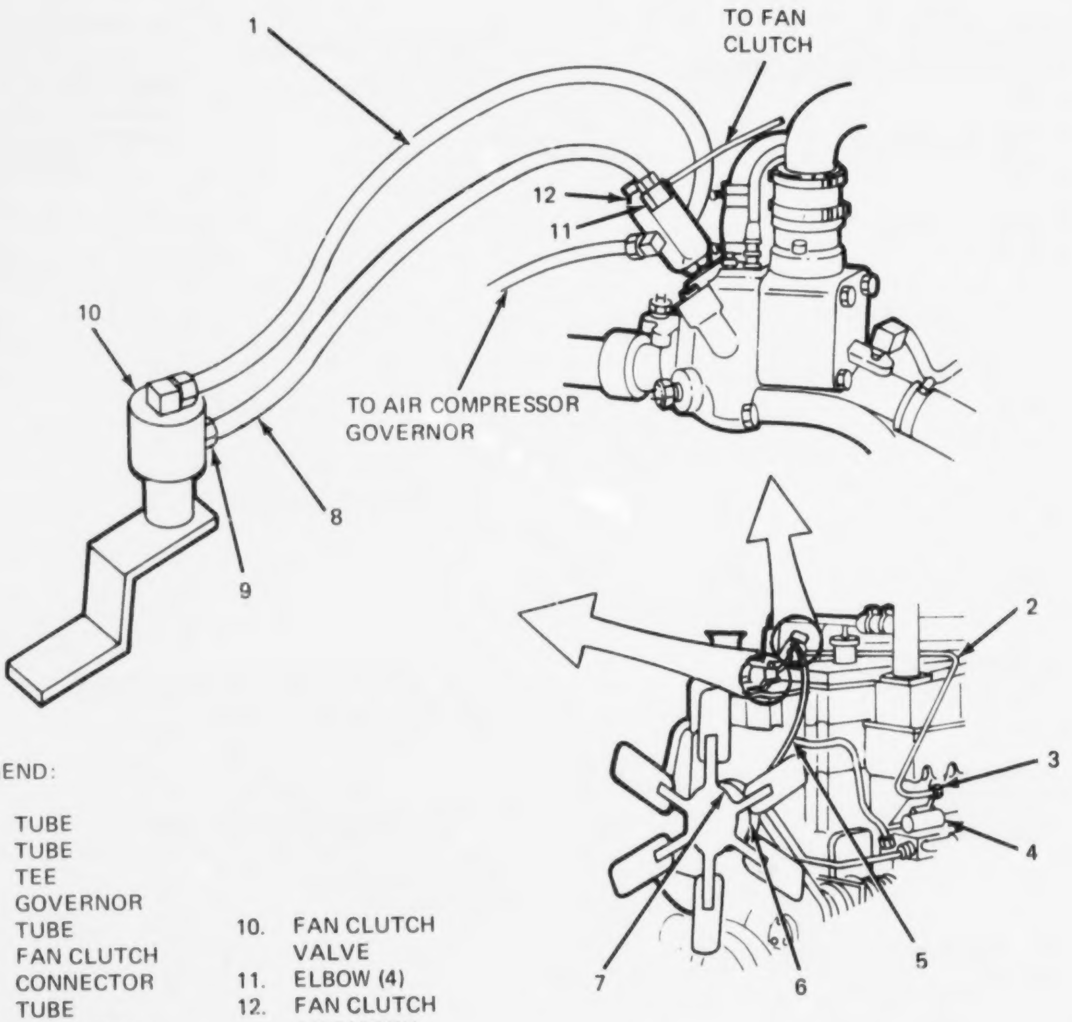
Be sure to stay completely clear of fan blades. Do not reach into fan clutch area while engine is operating.

LOCATION/ITEM	ACTION	REMARKS
17. Tubes, fittings, and connections.	Use soap solution to check for leaks.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM.

4-49. FAN CLUTCH ACTUATOR TUBES MAINTENANCE (M919)(Continued).

LOCATION/ITEM	ACTION	REMARKS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TO FAN CLUTCH
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TO AIR COMPRESSOR GOVERNOR
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6
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LEGEND:

1. TUBE
2. TUBE
3. TEE
4. GOVERNOR
5. TUBE
6. FAN CLUTCH
7. CONNECTOR
8. TUBE
9. CONNECTOR
10. FAN CLUTCH VALVE
11. ELBOW (4)
12. FAN CLUTCH ACTUATOR

TA 075652

COOLING SYSTEM.

4-50. HEATER SHUTOFF VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(15)
c. Bleeding Heater.	(5)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container(s).
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Coolant Drained below Level of Valve.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-10.
TM9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

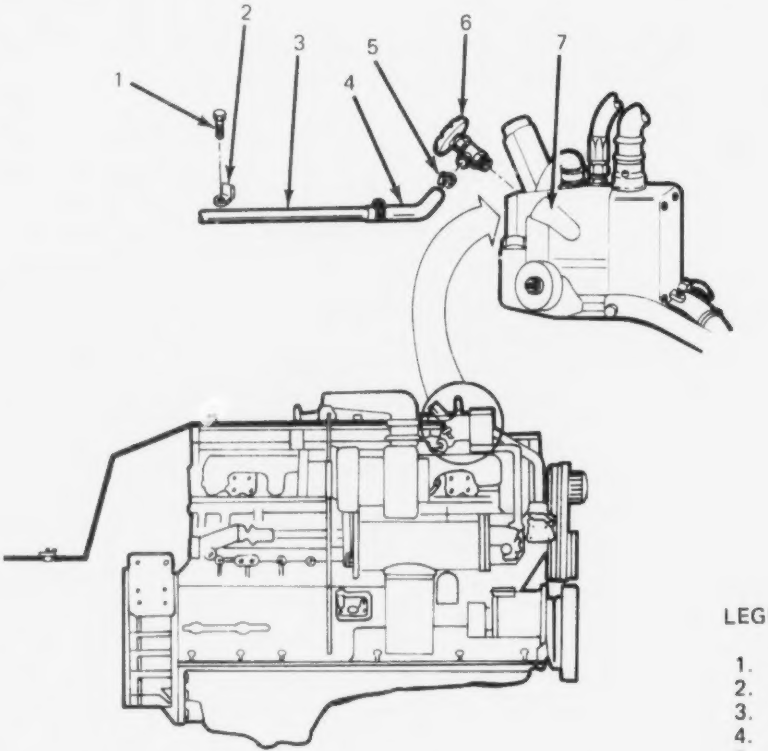
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two clamps (5).	Loosen.	
2. Heater tube (3) and rubber hose (4).	Remove from valve (6).	If necessary you may remove clamp (2) by unscrewing capscrew (1).
3. Valve (6).	Unscrew and remove from manifold (7).	



LEGEND:

1. CAPSCREW
2. CLAMP
3. HEATER TUBE
4. RUBBER HOSE
5. CLAMP (2)
6. VALVE
7. MANIFOLD

TA 074677

COOLING SYSTEM.

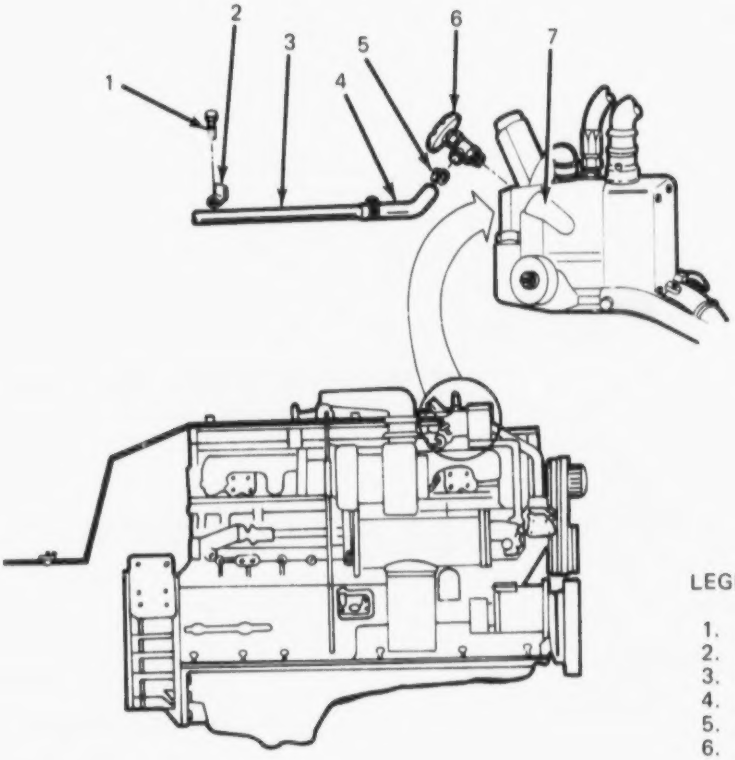
4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Valve (6).	a. Coat threads with liquid teflon. b. Screw into adapter manifold (7).	
5. Heater tube (3) and rubber hose (4).	a. Connect to valve (6). b. Tighten clamps (5).	If you removed clamp (1), put it back on and tighten capscrew (2).
C. BLEEDING HEATER.		
	NOTE Before removing outlet hose, place clean container under heater openings to catch coolant.	
6. Cab/heater outlet hose.	Loosen clamp and disconnect hose (para 11-27).	
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Cab/heater knob, heater outlet hose.	a. Pull knob (see TM 9-2320-273-10). b. When coolant flows from heater, push knob back in. c. Immediately connect hose to heater. Tighten clamp. d. Pull knob out again.	
9. Valve (6).	a. With engine running, check for leaks.	

COOLING SYSTEM.

4-50. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CAPSCREW
2. CLAMP
3. HEATER TUBE
4. RUBBER HOSE
5. CLAMP (2)
6. VALVE
7. MANIFOLD

TA 074678

COOLING SYSTEM.

4-51. WATER PUMP BELT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Adjustment.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Belt Tension Gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-44A.	Fan Removed.
4-45A.	Fan Belts Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

None.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

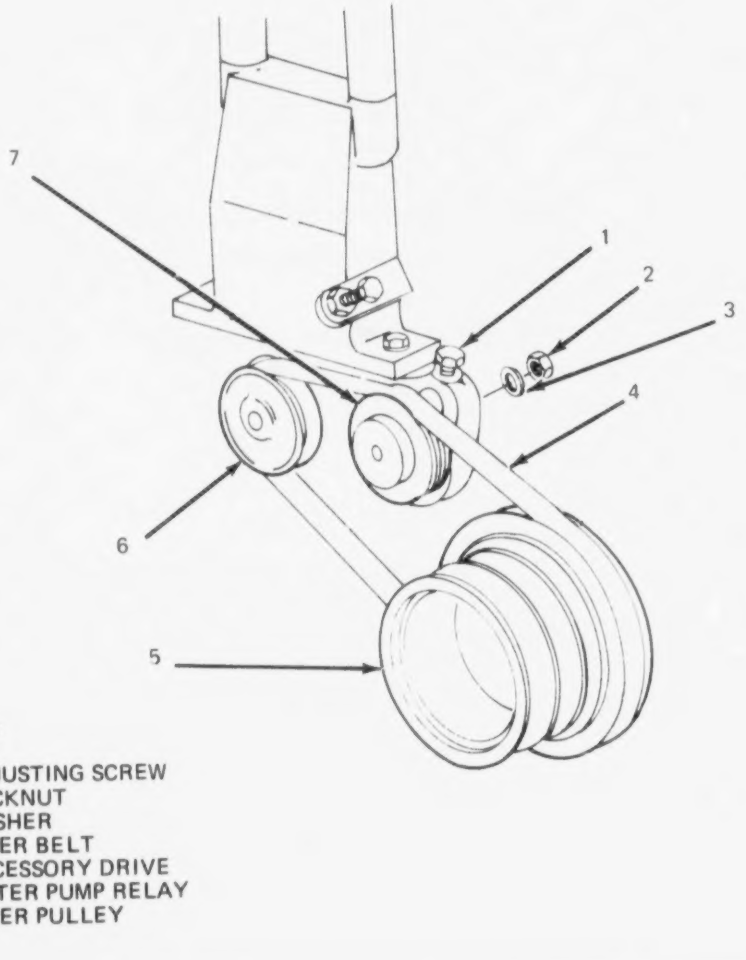
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-51. WATER PUMP BELT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Idler pulley locknut (2) and washer (3).	Loosen.	
2. Idler belt adjusting screw (1).	Loosen.	
3. Idler belt (4).	Take off.	Fan belts and fan must be removed first.



LEGEND:

1. ADJUSTING SCREW
2. LOCKNUT
3. WASHER
4. IDLER BELT
5. ACCESSORY DRIVE
6. WATER PUMP RELAY
7. IDLER PULLEY

TA 074679

4-51. WATER PUMP BELT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Idler belt (4).	Put on over idler pulley (7), water pump pulley (6), and accessory drive (5).	Do not force belt on with screwdriver.
C. ADJUSTMENT.		
5. Idler belt adjusting screw (1).	Adjust until belt tension is 90/100 on belt tension gage.	
6. Idler pulley locknut (2).	Tighten 50 lb-ft (68 N·m) with torque wrench.	

NOTE

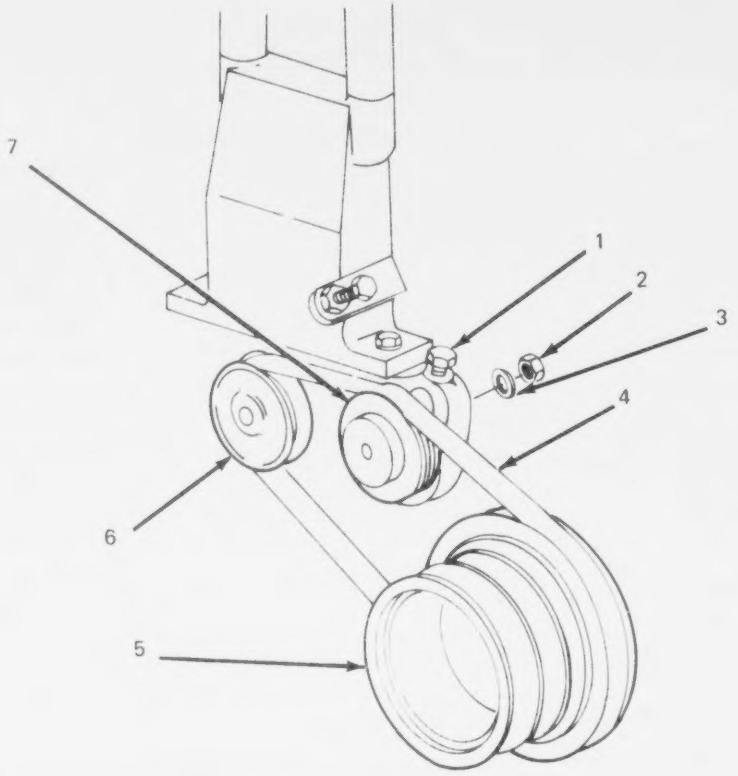
Follow-on maintenance action required:

Install and adjust fan belts; refer to 4-45B and C.

Install fan; refer to para 4-44B and C.

4-51. WATER PUMP BELT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. ADJUSTING SCREW
2. LOCKNUT
3. WASHER
4. IDLER BELT
5. ACCESSORY DRIVE
6. WATER PUMP RELAY
7. IDLER PULLEY

TA 074680

4-52. WATER MANIFOLD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(25)
b. Inspection.	(5)
c. Installation.	(30)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

O-Rings (4) (5330-00-506-4874).
Sealing Rings (6) (5330-00-143-8369).
Gasket (3011931) (15434).
Gasket (208132) (15434).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Coolant Drained below Manifold Level.
4-46A.	Fan Clutch Actuator Removed.
5-73A.	Water Temperature Switch Wire Removed.
4-25A.	Air Cleaner Assembly Removed.
4-27A.	Turbo Air Inlet Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCE (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

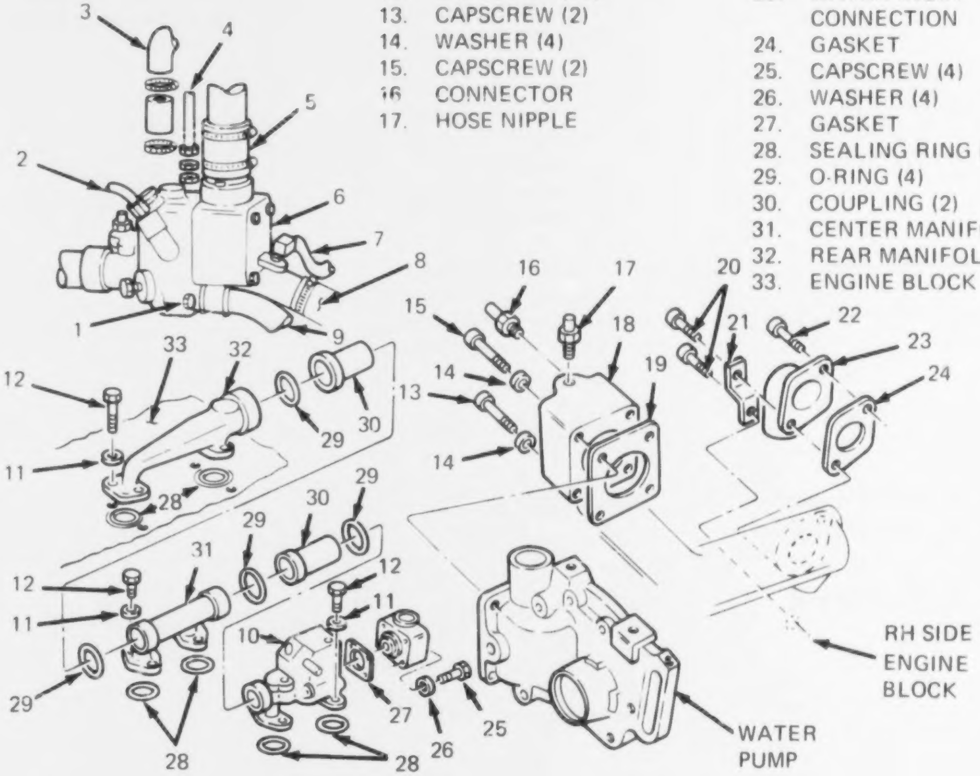
COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Return hose (3) and radiator hose (5).	a. Loosen clamp. b. Disconnect hose.	

LEGEND:

1. CAPSCREW
2. HEATER HOSE
3. RETURN HOSE
4. DEAERATION LINE
5. RADIATOR HOSE
6. THERMOSTAT HOUSING
7. AIR COMPRESSOR LINE
8. HOSE
9. TRANSFER TUBE
10. FRONT MANIFOLD
11. WASHER (12)
12. CAPSCREW (12)
13. CAPSCREW (2)
14. WASHER (4)
15. CAPSCREW (2)
16. CONNECTOR
17. HOSE NIPPLE
18. WATER TRANSFER CONNECTION
19. GASKET
20. CAPSCREW (2)
21. BRACKET
22. CAPSCREW
23. WATER INLET CONNECTION
24. GASKET
25. CAPSCREW (4)
26. WASHER (4)
27. GASKET
28. SEALING RING (6)
29. O-RING (4)
30. COUPLING (2)
31. CENTER MANIFOLD
32. REAR MANIFOLD
33. ENGINE BLOCK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RH SIDE ENGINE BLOCK
WATER PUMP

TA 074681

4-52. WATER MANIFOLD MAINTENANCE (Continued).

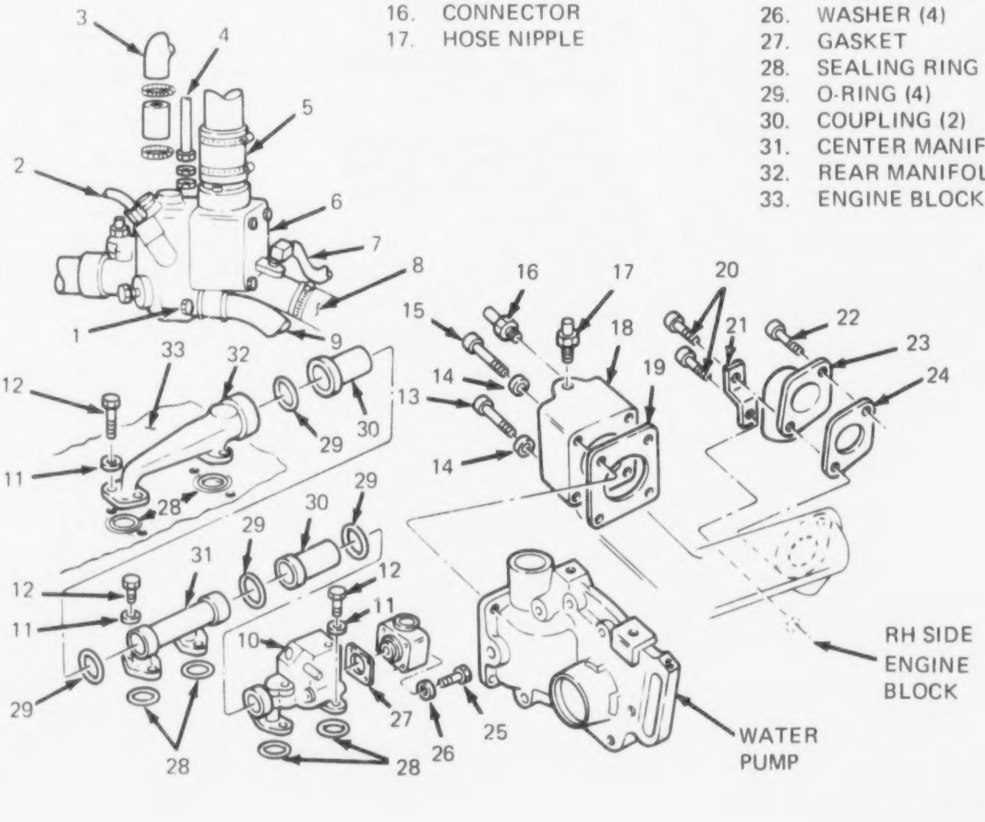
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Transfer tube (9).	a. Remove capscrew (1). b. Remove tube (9).	
3. Deaeration line (4) heater hose (2), air compressor line (7), and hose (8).	Remove from front manifold (10).	
4. Four capscrews (25) and washers (26).	Unscrew and remove thermostat housing (6).	
5. Rear manifold (32), two O-rings (29), coupling (30), two sealing rings (28), four capscrews (12),and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove rear manifold and coupling. c. Throw away sealing rings and O-rings.	Examine O-rings and sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
6. Center manifold (31), coupling (30), two O-rings (29), sealing rings (28), four capscrews (12),and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove center manifold and coupling. c. Throw away O-rings and sealing rings.	Examine O-rings and sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
7. Front manifold (10), gasket (27), two sealing (18), four capscrews (12), and washers (11).	a. Unscrew and remove capscrews and washers. b. Remove front manifold. c. Throw away gasket and sealing rings.	Examine sealing rings as you remove them. Leaks may sometimes be repaired by replacing broken or damaged rings.
8. Hose nipple (17) and connector (16).	Unscrew and remove.	
9. Two capscrews (13), two capscrews (15),and four washers (14).	Unscrew and remove.	
10. Two capscrews (20) and capscrews (22).	Unscrew and remove water transfer connection (18), gasket (19), bracket (21), water inlet connection (23),and gasket (24).	Discard gasket (19)and (24).

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. CAPSCREW
2. HEATER HOSE
3. RETURN HOSE
4. DEAERATION LINE
5. RADIATOR HOSE
6. THERMOSTAT HOUSING
7. AIR COMPRESSOR LINE
8. HOSE
9. TRANSFER TUBE
10. FRONT MANIFOLD
11. WASHER (12)
12. CAPSCREW (12)
13. CAPSCREW (2)
14. WASHER (4)
15. CAPSCREW (2)
16. CONNECTOR
17. HOSE NIPPLE
18. WATER TRANSFER CONNECTION
19. GASKET
20. CAPSCREW (2)
21. BRACKET
22. CAPSCREW
23. WATER INLET CONNECTION
24. GASKET
25. CAPSCREW (4)
26. WASHER (4)
27. GASKET
28. SEALING RING (6)
29. O-RING (4)
30. COUPLING (2)
31. CENTER MANIFOLD
32. REAR MANIFOLD
33. ENGINE BLOCK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RH SIDE ENGINE BLOCK
WATER PUMP

TA 074682

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION.		
11. Front manifold (10), center manifold (31), rear manifold (32), two couplings (30), thermostat housing (6), engine block (33), water transfer connection (18), and water inlet connection (23).	a. Inspect mating surfaces for: 1. Burrs. 2. Cracks. 3. Distortion. b. Inspect manifolds and couplings for: 1. Cracks. 2. Leaks. 3. Discoloration.	Replace as necessary.
C. INSTALLATION.		
12. Hose nipple (17) and connector (16).	Screw into water transfer connection (18).	
13. New gasket (19) and water transfer connection (18).	Install to water pump with two capscrews (13), two capscrews (15), and four washers (14).	
14. New gasket (24), water inlet connection (23), and bracket (21).	Mount to water transfer connection (18) as shown and to side of engine with two capscrews (20) and one capscrew (22).	

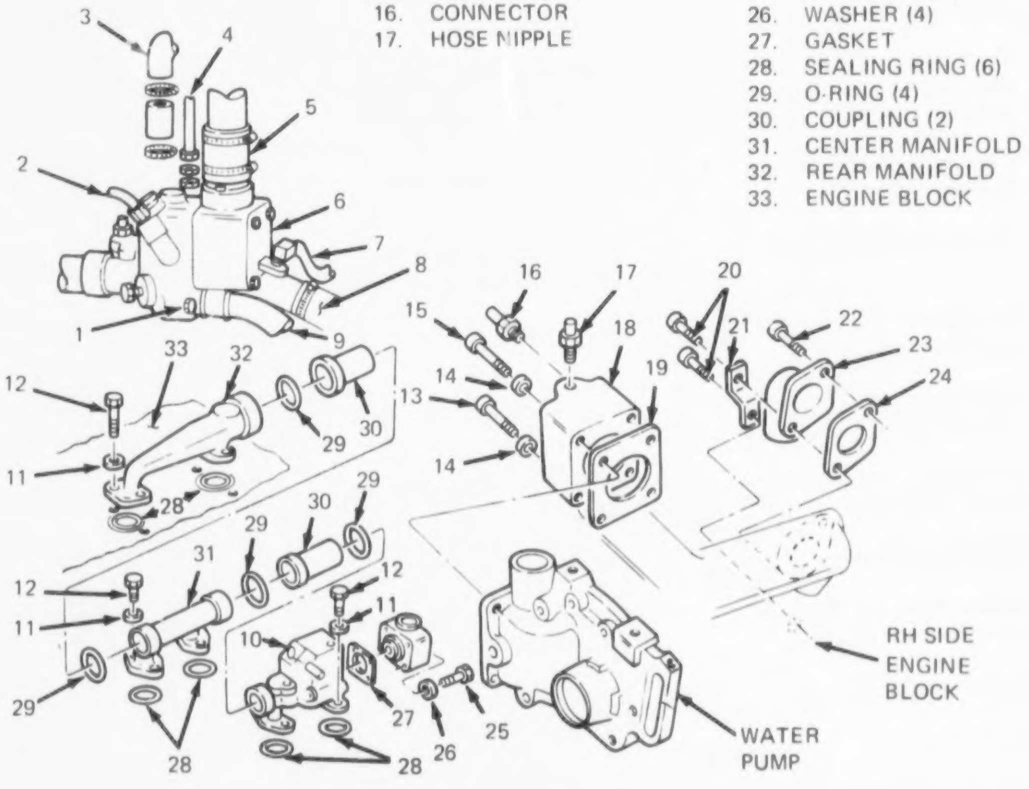
COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. CAPSCREW
2. HEATER HOSE
3. RETURN HOSE
4. DEAERATION LINE
5. RADIATOR HOSE
6. THERMOSTAT HOUSING
7. AIR COMPRESSOR LINE
8. HOSE
9. TRANSFER TUBE
10. FRONT MANIFOLD
11. WASHER (12)
12. CAPSCREW (12)
13. CAPSCREW (2)
14. WASHER (4)
15. CAPSCREW (2)
16. CONNECTOR
17. HOSE NIPPLE
18. WATER TRANSFER CONNECTION
19. GASKET
20. CAPSCREW (2)
21. BRACKET
22. CAPSCREW
23. WATER INLET CONNECTION
24. GASKET
25. CAPSCREW (4)
26. WASHER (4)
27. GASKET
28. SEALING RING (6)
29. O-RING (4)
30. COUPLING (2)
31. CENTER MANIFOLD
32. REAR MANIFOLD
33. ENGINE BLOCK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28
26
25
RH SIDE ENGINE BLOCK
WATER PUMP

TA 074683

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
15. Front manifold (10), and two new sealing rings (28).	Place in position on engine block (33).	
16. Four capscrews (12) and washers (11).	Screw on finger tight.	
17. Coupling (30), two new O-rings (29), center manifold (31) and two new sealing rings (28).	Place in position against front manifold (10) and engine block (33).	
18. Four capscrews (12) and washers (11).	Screw on finger tight.	
19. Rear manifold (32), two new O-rings (29), coupling (30), and two new sealing rings (28).	Place in position on engine block (33) against center manifold (31).	
20. Four capscrews (12) and washers (11).	Screw on finger tight.	
21. Twelve capscrews (12).	Tighten to 35 lb-ft (47 N·m) with torque wrench.	Alternate to tighten down evenly.
22. New gasket (27) and thermostat housing (6).	Set in place.	
23. Four capscrews (25) and washers (26).	Install and tighten.	
24. Deaeration line (4) and heater hose (2).	Screw into front manifold (10).	
25. Air compressor line (7).	Install and tighten.	
26. Return hose (3), radiator hose (5) and hose (8).	Attach to front manifold (10) and tighten clamps.	
27. Transfer tube (9).	Install to front manifold (10) with capscrew (1).	

COOLING SYSTEM.

4-52. WATER MANIFOLD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Follow on maintenance required:

Install water temperature switch wire; refer to paragraph 5-73B.

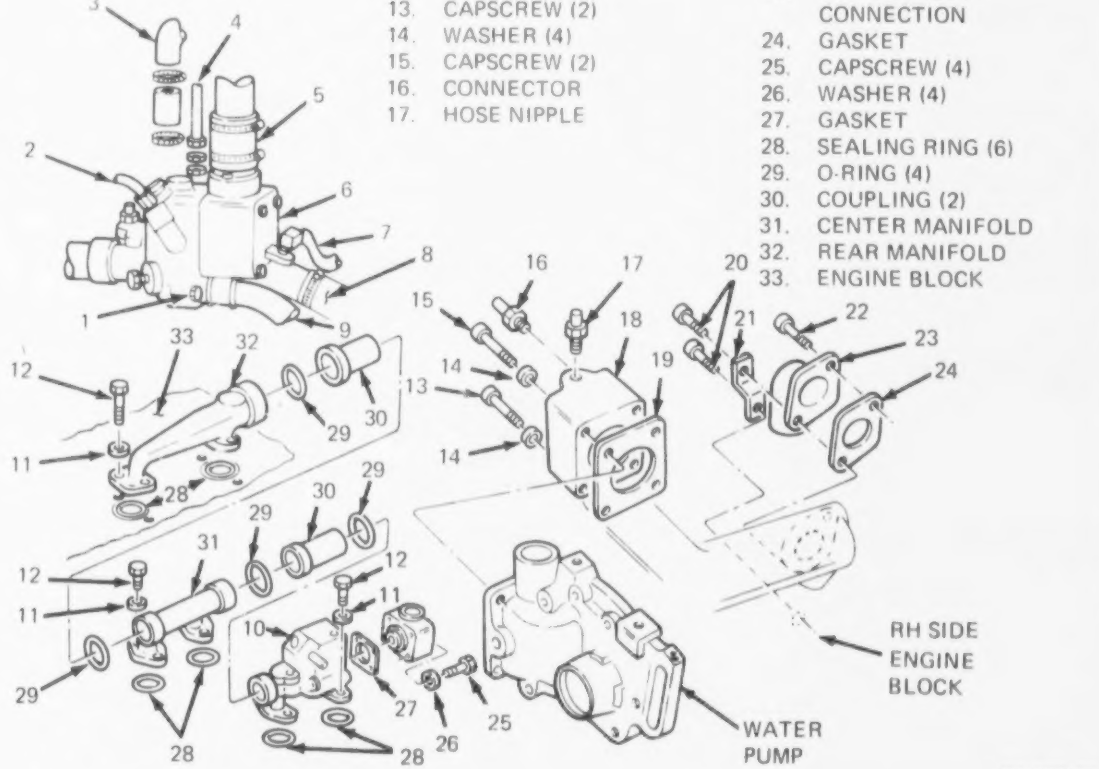
Install fan clutch actuator; refer to paragraph 4-46C.

Install air cleaner and turbocharger air intake; refer to paragraph 4-25D & 4-27C.

Refill cooling system and check for leaks; refer to paragraph 4-42C & D.

LEGEND:

1. CAPSCREW
2. HEATER HOSE
3. RETURN HOSE
4. DEAERATION LINE
5. RADIATOR HOSE
6. THERMOSTAT HOUSING
7. AIR COMPRESSOR LINE
8. HOSE
9. TRANSFER TUBE
10. FRONT MANIFOLD
11. WASHER (12)
12. CAPSCREW (12)
13. CAPSCREW (2)
14. WASHER (4)
15. CAPSCREW (2)
16. CONNECTOR
17. HOSE NIPPLE
18. WATER TRANSFER CONNECTION
19. GASKET
20. CAPSCREW (2)
21. BRACKET
22. CAPSCREW
23. WATER INLET CONNECTION
24. GASKET
25. CAPSCREW (4)
26. WASHER (4)
27. GASKET
28. SEALING RING (6)
29. O-RING (4)
30. COUPLING (2)
31. CENTER MANIFOLD
32. REAR MANIFOLD
33. ENGINE BLOCK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RH SIDE ENGINE BLOCK
WATER PUMP

TA 075653

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(15)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Gasket, Water Pump to
Engine Block (5330-01-066-5350).
Gasket, Water Pump to
Heater Manifold, 208132 (15434).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-44A.	Fan Removed.
4-45A.	Fan Clutch and Belts Removed.
4-51A.	Water Pump Belts Removed.
4-42A.	Coolant Drained.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
None.

TROUBLESHOOTING REFERENCES
Table 4-1.

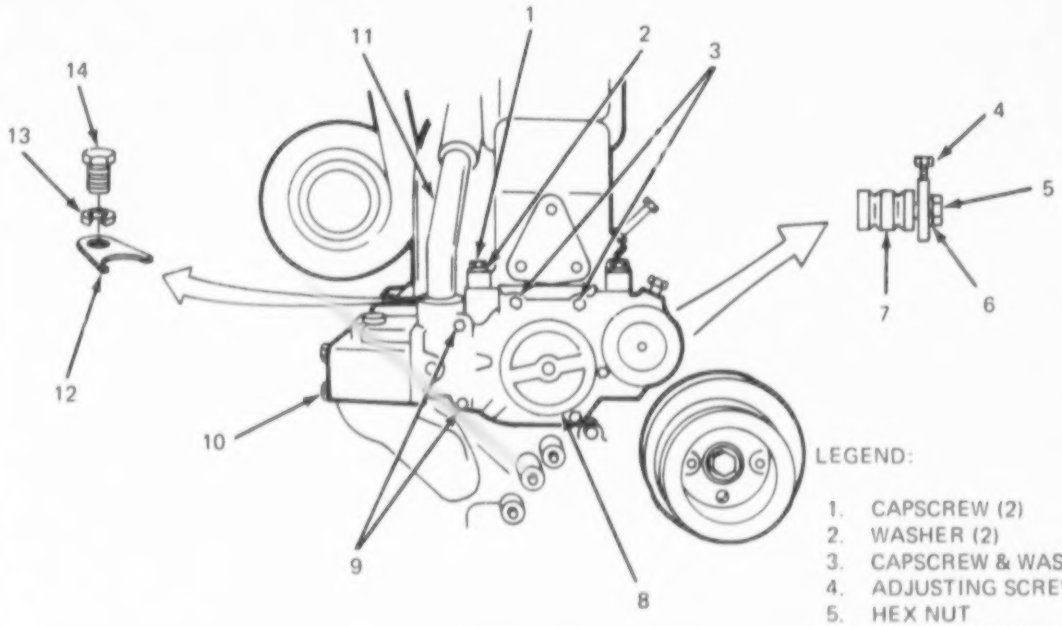
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CAPSCREW (2)
2. WASHER (2)
3. CAPSCREW & WASHER (4)
4. ADJUSTING SCREW
5. HEX NUT
6. LOCKWASHER
7. IDLER PULLEY
8. WATER PUMP
9. CAPSCREW & WASHER (2)
10. CAPSCREW & WASHER (4)
11. BYPASS TUBE
12. CLAMP
13. LOCKWASHER
14. CAPSCREW

TA 074684

4-53. WATER PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Adjusting screw (4).	Remove.	
2. Idler pulley (7).	Remove hex nut (5) and lockwasher (6) and remove idler pulley from water pump (8).	
3. Two capscrews (1) and washers (2).	Loosen and remove.	
4. Four capscrews and washers (3).	Loosen and remove.	
5. Two capscrews and washers (9).	Loosen and remove.	
6. Capscrew (14), lockwasher (13), and clamp (12).	Unscrew and remove.	
7. Four capscrews and washers (10).	Unscrew and remove.	
8. Water pump (8) and gaskets.	a. Remove from engine and bypass tube (11). b. Throw away gaskets.	
B. INSTALLATION.		
9. Water pump (8) and new gaskets.	Put in position on bypass tube (11) and engine.	
10. Four capscrews and washers, (10).	Install and tighten to 35 lb-ft (47 N·m).	
11. Capscrew (14), lockwasher (13), and clamp (12).	Install and tighten securely.	
12. Two capscrews and washers (9), four capscrews and washers (3).	Install and tighten to 35 lb-ft (47 N·m).	
13. Two capscrews (1) and washers (2).	Install and tighten securely.	
14. Idler pulley (7).	Install in water pump (8) and secure with hex nut (5) and lockwasher (6).	Do not tighten.

COOLING SYSTEM.

4-53. WATER PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
15. Adjusting screw (4).	Install.	No specific adjustment needed at this time.

NOTE

Follow-on maintenance action required:

Install water pump belt; refer to para 4-51B and C.

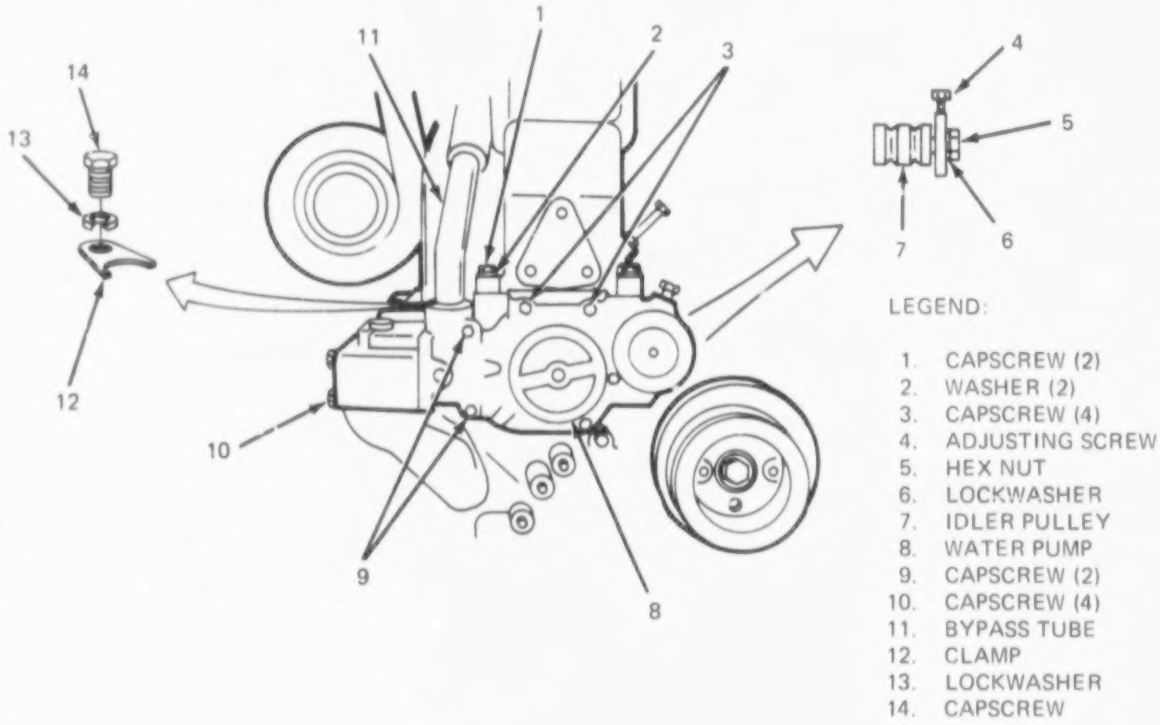
Adjust water pump belt; refer to para 4-51C.

Install fan clutch; refer to para 4-45C.

Install fan belt; refer to para 4-45C.

Install fan; refer to para 4-44B.

Replenish coolant and check for leaks, refer to para 4-42C and D. Fill with arctic anti freeze if sub zero.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LEGEND:
1. CAPSCREW (2)
2. WASHER (2)
3. CAPSCREW (4)
4. ADJUSTING SCREW
5. HEX NUT
6. LOCKWASHER
7. IDLER PULLEY
8. WATER PUMP
9. CAPSCREW (2)
10. CAPSCREW (4)
11. BYPASS TUBE
12. CLAMP
13. LOCKWASHER
14. CAPSCREW

TA 074685

COOLING SYSTEM.

4-54. WATER PUMP IDLER PULLEY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
c. Operational Check.	(5)
	25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

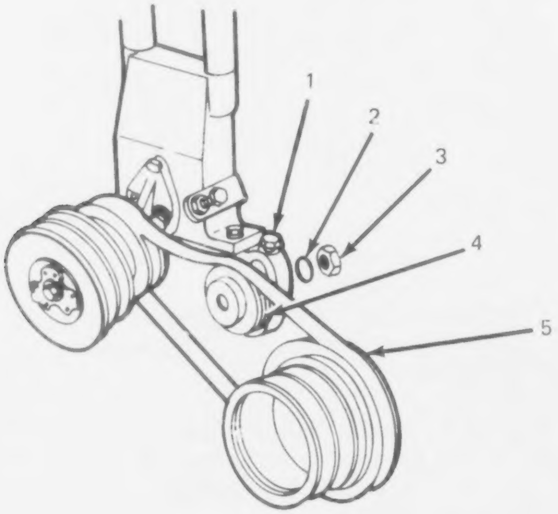
None.

GENERAL SAFETY INSTRUCTIONS

None.

4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (3) and washer (2).	Loosen and remove.	
2. Idler belt adjusting screw (1).	Remove.	
3. Idler pulley (4).	Remove.	



LEGEND:

1. ADJUSTING SCREW
2. WASHER
3. NUT
4. IDLER PULLEY
5. BELT

TA 074686

4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Idler pulley (4).	Set into place.	
5. Idler belt adjusting screw (1).	Install.	
6. Washer (2) and nut (3).	Screw on finger tight.	
7. Belt (5).	a. Adjust belt tension with adjusting screw (1) until belt tension gage reads 90/100. b. Tighten locknut (3) to 50 lb-ft (68 N·m) with a torque wrench.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	

WARNING

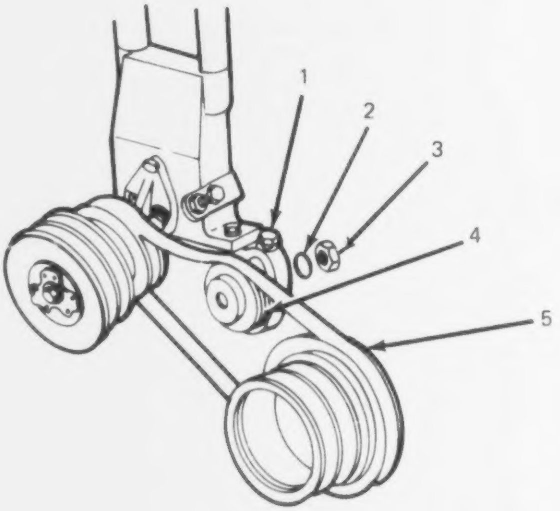
Be sure to stay completely clear of fan blades. Do not reach into fan area while engine is operating.

LOCATION/ITEM	ACTION	REMARKS
9. Idler pulley (4).	Check that belt rides smoothly on pulley and that pulley is not slipping.	
10. Engine.	Shut down (see TM 9-2320-273-10).	

COOLING SYSTEM.

4-54. WATER PUMP IDLER PULLEY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. ADJUSTING SCREW
2. WASHER
3. NUT
4. IDLER PULLEY
5. BELT

TA 074687

ALTERNATOR DRIVE SYSTEM.

4-55. ALTERNATOR BELTS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Adjustment.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Belt Tension Gage.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

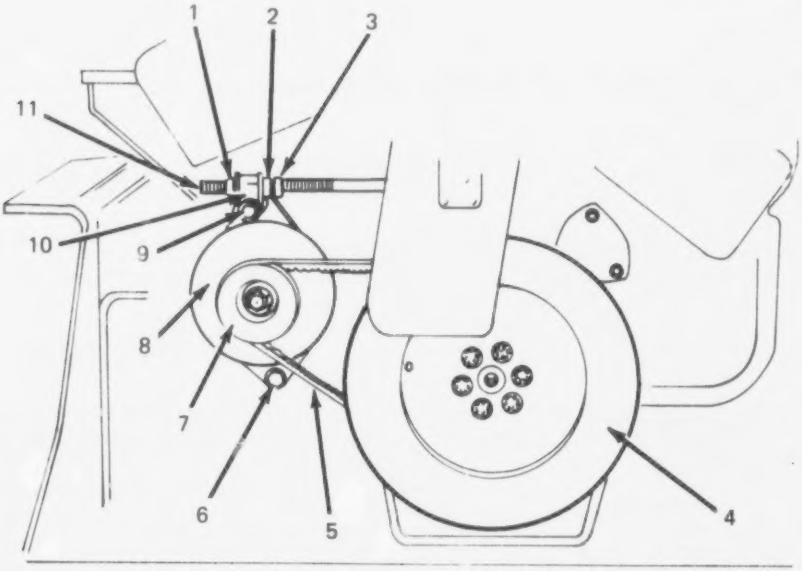
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

4-55. ALTERNATOR BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Alternator capscrews (6) and (9).	Loosen.	
2. Adjusting nut (3).	Loosen.	
3. Adjusting nut (2).	Loosen to allow alternator (8) to slide towards engine along adjusting rod (11), enough to remove alternator belts (5).	
4. Two alternator belts (5).	Take off.	The belts are a matched set.



LEGEND:

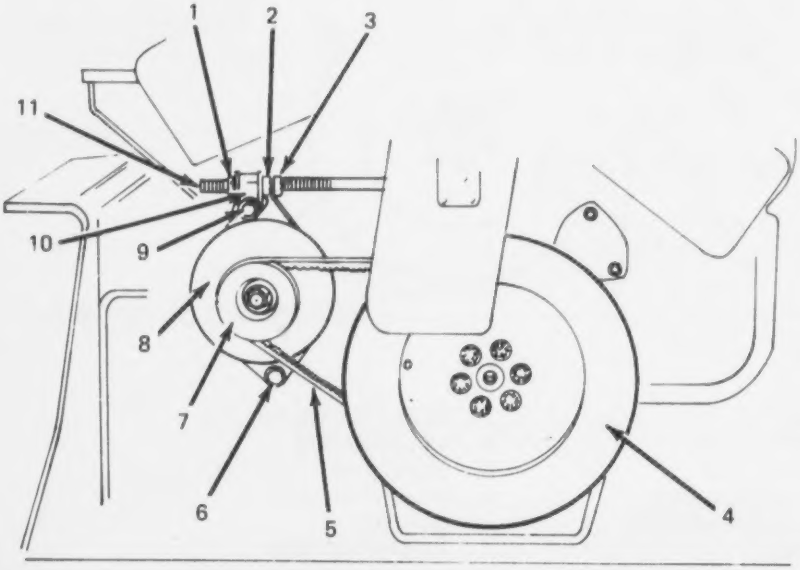
1. JAM NUT
2. ADJUSTING NUT
3. ADJUSTING NUT
4. VIBRATION DAMPER
5. ALTERNATOR BELT (2)
6. CAPSCREW
7. ALTERNATOR PULLEY
8. ALTERNATOR
9. CAPSCREW
10. ADJUSTING ROD COLLAR
11. ADJUSTING ROD

TA 074688

ALTERNATOR DRIVE SYSTEM.

4-55. ALTERNATOR BELTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Alternator belts (5).	a. Put onto alternator pulley (7) and vibration damper (4). b. Push alternator away from engine until belts stop the travel of alternator.	Do not pry on with screwdriver. Always replace belts as a set. Never put on just one new belt.
C. ADJUSTMENT.		
6. Adjusting nut (2).	Tighten against adjusting rod collar (10) until belt tension is 110 lbs for new belts, or 80 lbs for used belts.	A used belt is one that has been on the truck more than a thousand miles.
7. Jam nut (1)	Tighten against collar (10).	
8. Adjusting nut (3).	Tighten against adjusting nut (2).	
9. Alternator capscrews (6) and (9).	Torque to 30 lb-ft (41 N·m).	



LEGEND:

1. JAM NUT
2. ADJUSTING NUT
3. ADJUSTING NUT
4. VIBRATION DAMPER
5. ALTERNATOR BELT (2)
6. CAPSCREW
7. ALTERNATOR PULLEY
8. ALTERNATOR
9. CAPSCREW
10. ADJUSTING ROD COLLAR
11. ADJUSTING ROD

TA 074689

CHAPTER 5

ELECTRICAL AND INSTRUMENTATION SYSTEMS MAINTENANCE

5-1. OVERVIEW.

This chapter provides you with the following information related to electrical and instrumentation systems maintenance:

a. All required special tools and equipment.

b. Other technical manuals.

c. Troubleshooting procedures.

d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

5-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the electrical and instrumentation maintenance procedures described in this chapter are limited to the test meters shown in para 5-6.

5-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

5-5. INTRODUCTION.

a. Scope. This section contains detailed troubleshooting information for locating and correcting malfunctions in the electrical system. Each of the functional subsystems is treated separately by means of:

(1) A physical and functional description.

(2) A circuit schematic.

(3) A brief overall subsystem check.

(4) Step-by-step test to diagnose problems using authorized test equipment.

b. Subsystem Circuits. The functional subsystem circuits covered in this section are presented in the following sequence:

(1) Battery (table 5-1).

(2) Starting (table 5-2).

(3) Ether Quick-Start Control (table 5-3).

(4) Engine Retarder Control (table 5-4).

(5) Battery Charging (table 5-5).

(6) Warning Lamps and Alarms (table 5-6).

(7) Instruments and Indicators (table 5-7).

(8) Headlamps (table 5-8).

(9) Marker Lamps (table 5-9).

(10) Parking and Tail Lamps (table 5-10).

(11) Stop and Turn Signal Lamps (table 5-11).

(12) Backup Lamps (table 5-12).

(13) Blackout Lighting System (table 5-13).

(14) Miscellaneous Electrical (table 5-14).

c. General Troubleshooting Procedures. The following procedures are general in nature and should be applied as appropriate during any electrical troubleshooting.

(1) Research the Problem. Before you start detail troubleshooting procedures, review the wiring diagram and schematic (Appendix D) to thoroughly familiarize yourself with the circuit(s) involved. Analyze the symptoms and conditions and use common sense and logic to determine the most likely cause for the problem, then troubleshoot that circuit first. The more information you have concerning the problem, the easier it will be to troubleshoot.

5-5. INTRODUCTION (Continued).

(2) General Approach. First, isolate to the subsystem level (in cases where more than one subsystem is involved); next, isolate the problem to a single circuit within the subsystem; then isolate the problem to the faulty component. An example of an exception to this rule would be in cases where a lamp is out; the first step would be to check the bulb.

(3) Wiring. Frayed, broken, loose, or corroded wiring is a common source of problems in any electrical circuit. Always make a visual inspection before starting detail troubleshooting. Observe in particular, contacts to ground. Components with case grounds are especially troublesome.

(4) Circuit Breakers.

CAUTION

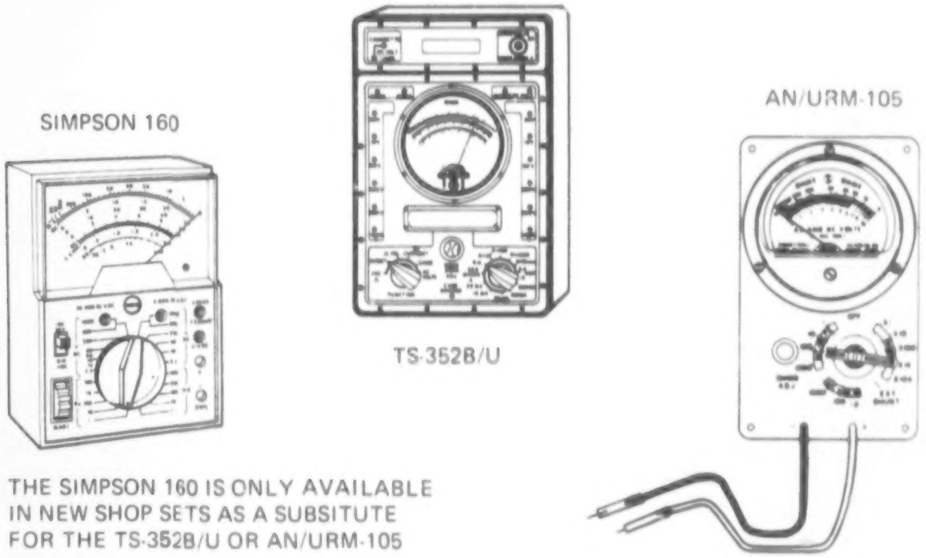
Never jumper a cycling circuit breaker unless specifically instructed to do so in the troubleshooting procedure. The overload could cause serious damage to equipment and result in a fire.

The circuit breakers in these circuits are the automatic recycling type. If an overload exists, the circuit breaker will open and shut off all circuits being fed by that particular circuit breaker. After cooling, the circuit breaker will close. If the problem still exists the circuit breaker will again open. This cycle will continue until the problem is corrected. When a circuit breaker is cycling, it will feel warm to the touch and you can hear a clicking sound.

(5) Relays. A relay is basically a two-element device — a coil and a set of contacts in a common housing. When voltage is applied to the coil, the contacts close (normally open relay) or open (normally closed relay). The relay provides a path of supply voltage to a circuit or component which draws a heavy current load. In troubleshooting, first be sure the coil is functioning. Connect a multimeter between frame ground and the hot side of the coil and check for 12 volts dc nominal. If voltage is present, disconnect the multimeter and measure voltage across any set of contacts with the coil voltage present. The meter should indicate either 12 or 24 volts dc nominal depending on the circuit involved. Sometimes it is advantageous to simply jumper across the relay contacts and if the inoperative circuit being checked works, a bad relay or voltage supply wiring is indicated.

5-6. TEST EQUIPMENT.

a. Introduction. In automotive troubleshooting, the Simpson 160, the TS-352B/U, and the AN/URM-105 will do the same job. Therefore, your automotive shop sets may contain any one of these multimeters (fig. 5-1). Any of these three multimeters can be used to troubleshoot the electrical system.



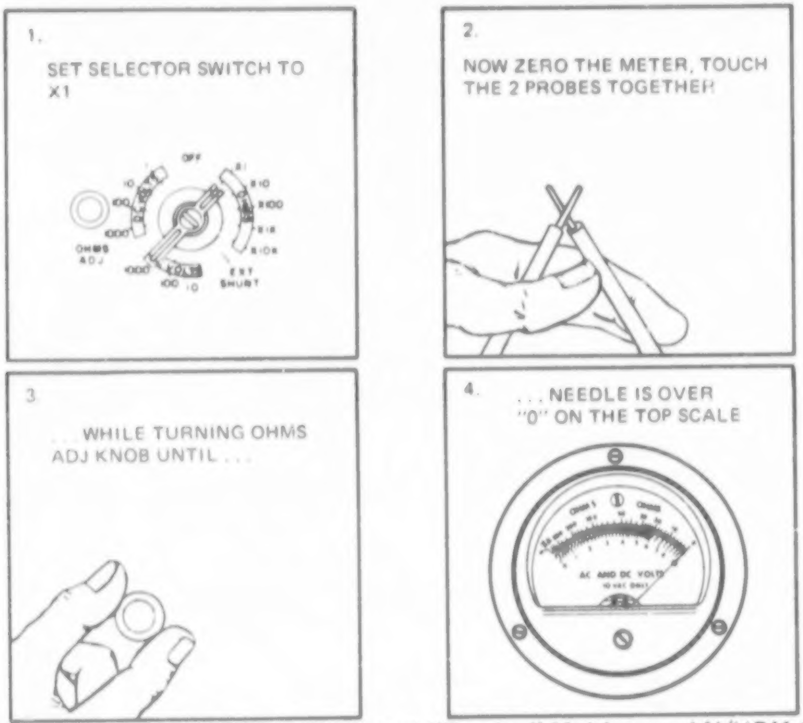
NOTE: THE SIMPSON 160 IS ONLY AVAILABLE IN NEW SHOP SETS AS A SUBSITUTE FOR THE TS-352B/U OR AN/URM-105

Figure 5-1. Multimeters

TA 074690

5-6. TEST EQUIPMENT (Continued).

b. Using the Ohms Scale. The Ohms Scale (fig. 5-2 thru fig. 5-4) is used to make tests for continuity, shorts, and resistance. The multimeter must be set up and "zeroed" before making these tests. Do the following steps that match the multimeter you have:



1. SET SELECTOR SWITCH TO X1

2. NOW ZERO THE METER, TOUCH THE 2 PROBES TOGETHER

3. . . . WHILE TURNING OHMS ADJ KNOB UNTIL . . .

4. . . . NEEDLE IS OVER "0" ON THE TOP SCALE

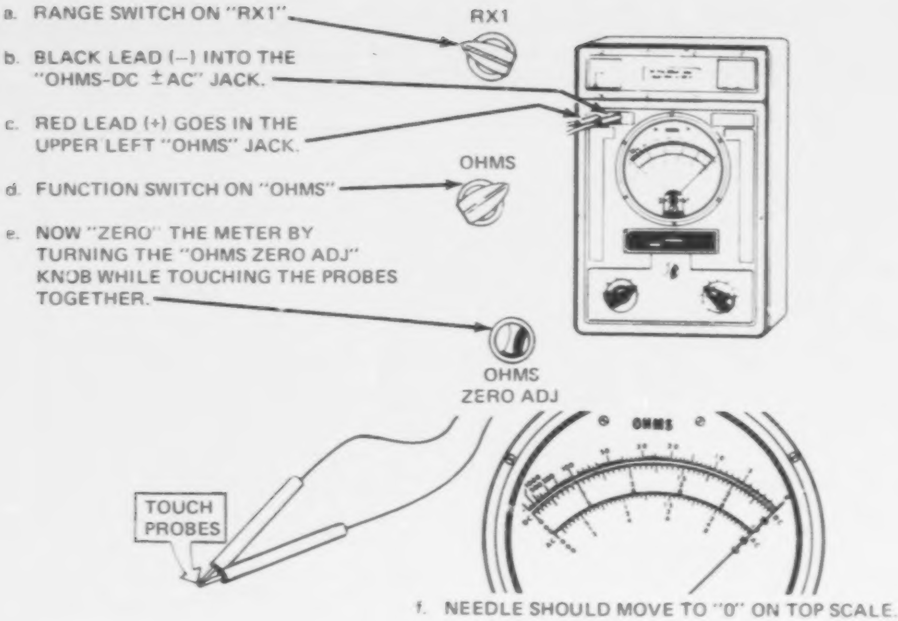
Figure 5-2. Using the Ohms Scale and "Zeroing" Multimeter AN/URM-105

NOTE

If needle will not "zero," replace the batteries. If the needle still will not "zero" after replacing the batteries, turn the meter in for repair.

TA 074691

5-6. TEST EQUIPMENT (Continued).



a. RANGE SWITCH ON "RX1".

b. BLACK LEAD (–) INTO THE "OHMS-DC ±AC" JACK.

c. RED LEAD (+) GOES IN THE UPPER LEFT "OHMS" JACK.

d. FUNCTION SWITCH ON "OHMS"

e. NOW "ZERO" THE METER BY TURNING THE "OHMS ZERO ADJ" KNOB WHILE TOUCHING THE PROBES TOGETHER.

f. NEEDLE SHOULD MOVE TO "0" ON TOP SCALE.

Figure 5-3. Using Ohms Scale and "Zeroing" Multimeter TS-352 B/U

NOTE

If needle will not "zero", replace the batteries. If the needle will not "zero" after replacing the batteries, turn the meter in for repair.

TA 074692

5-6. TEST EQUIPMENT (Continued).

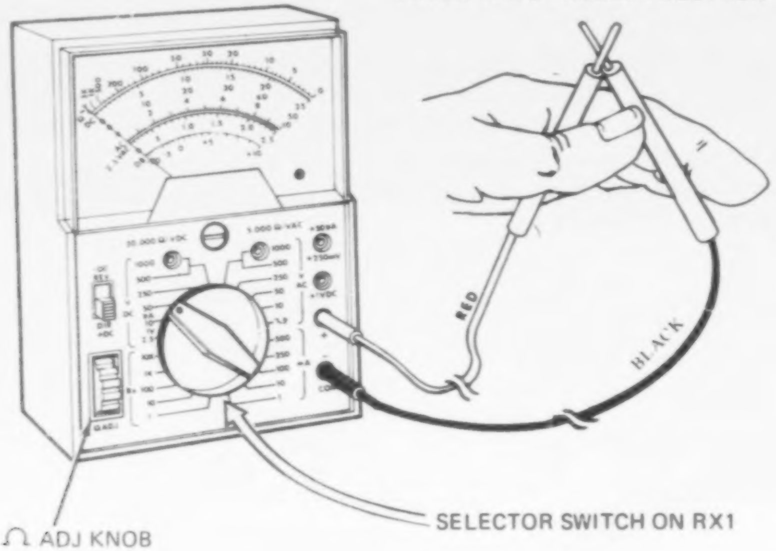
SIMPSON 160

(1) Set selector switch on "RX1".

(2) Put black probe in "COM-" jack.

(3) Put red probe in "+" jack.

(4) Now "zero" the meter. While touching the probes together, turn "Ω ADJ" knob until needle is over the "0" on the top scale.



TOUCH THE 2 PROBES TOGETHER

SELECTOR SWITCH ON RX1

Ω ADJ KNOB

Figure 5-4. Using Ohms Scale and "Zeroing" Multimeter Simpson 160

NOTE

If the needle will not "zero", replace the batteries. If the needle still will not "zero" after replacing the batteries, turn the meter in for repair.

TA 074693

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5-6. TEST EQUIPMENT (Continued).

c. Continuity Tests. Continuity tests are made to check for breaks in a circuit (such as the switch, light bulb, or electrical cable illustrated). To make a continuity check (fig. 5-5), do the following steps:

CAUTION

Failure to perform the following step can damage the multimeter.

(1) Disconnect the circuit being tested. To be safe, disconnect the battery ground strap.

(2) Set up and "zero" the multimeter.

(3) Connect the meter probes to both terminals of the circuit being tested. (The TS-352B/U is illustrated below, but the probes are connected to the circuit the same way with each of the three multimeters.)

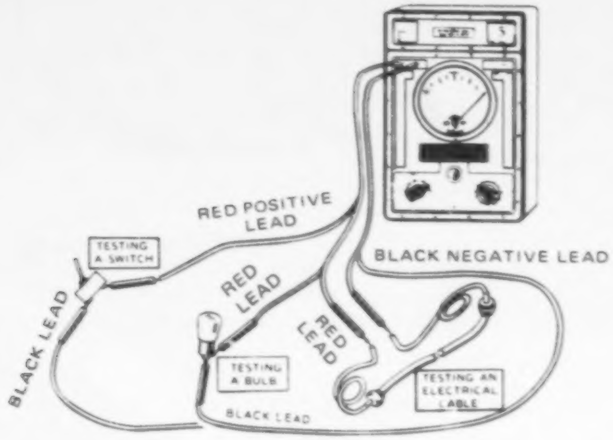

RED POSITIVE LEAD
TESTING A SWITCH
BLACK NEGATIVE LEAD
RED LEAD
RED LEAD
BLACK LEAD
TESTING A BULB
TESTING AN ELECTRICAL CABLE
BLACK LEAD

Figure 5-5. Making a Continuity Check

(4) Look at the meter needle.

(a) If the needle swings to the far right over the "0" on the top scale (on all three multimeters), the circuit has continuity.

(b) If the needle doesn't move, the circuit is open (broken).

(c) If the needle jumps or flickers, there is a loose connection in the circuit being tested.

TA 074694

5-6. TEST EQUIPMENT (Continued).

d. Testing for Shorts. A short (or short circuit) occurs when two circuits that should not be connected have metal-to-metal contact with each other. A short also occurs when a circuit that should not touch ground has metal-to-metal contact with ground. To check for shorts, do the following steps:

CAUTION

Failure to do the following step can damage the multimeter.

(1) Disconnect the circuit being tested. To be safe, disconnect the battery ground cable.

(2) Set up and "zero" the multimeter (para b.).

(3) With any of the three multimeters, connect one probe to one circuit and the other probe to the other circuit or ground (if checking for a short to ground). Figure 5-6 shows a check to see if wire "A" is shorted to wire "B" in the wiring harness.

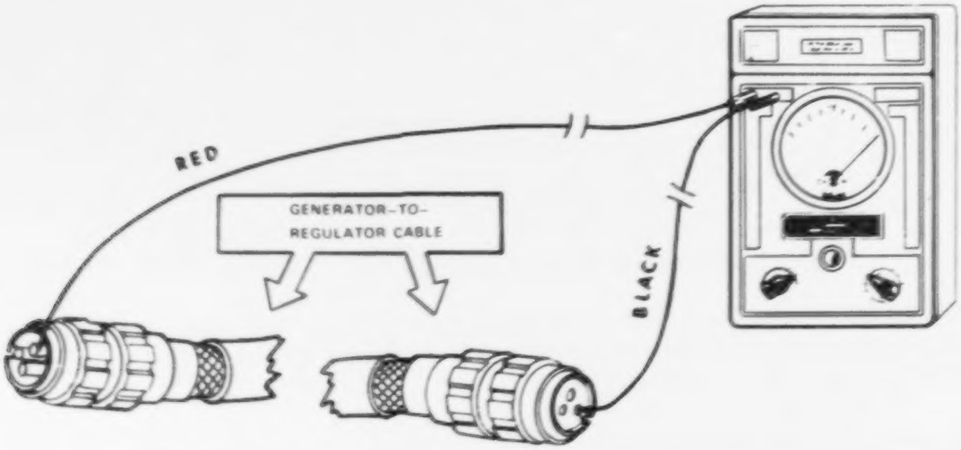


Figure 5-6. Testing for Shorts

(4) Look at the needle.

- *(a)* If the needle swings to the far right over the "0" on the top scale (on all three multimeters), the circuits are shorted.
- *(b)* If the needle doesn't move, the circuits are not shorted.
- *(c)* If needle jumps or flickers, the circuits are occasionally shorted.

e. Testing Resistance. To measure resistance in a circuit do the following steps.

CAUTION

Failure to do the following step can damage the multimeter.

TA 074695

5-6. TEST EQUIPMENT (Continued).

(1) Disconnect the circuit being tested. To be safe, disconnect the battery ground cable.

(2) Set up and "zero" the multimeter (para b).

(3) If the test in this manual calls for an "Ohms Range" different than "RX" or "X1," set the selector switch to that range (like "RX10" or "X10").

NOTE

"ZERO" the meter whenever you change ranges.

(4) With any of the three multimeters, connect the probes across the circuit or item to be measured. Figure 5-7 below shows measuring the resistance of a temperature sending unit:

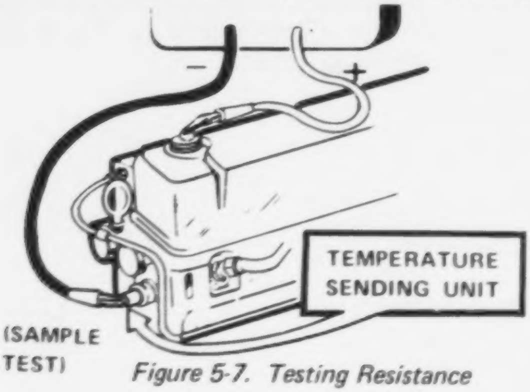


Figure 5-7. Testing Resistance

(5) Read the meter. If the meter switch is on the "RX1" or "X1" range, the reading is taken directly from the top scale. If the meter switch is on a different range, (fig. 5-8), multiply the reading on the scale according to the table below.

OHMS SWITCH SETTING.	YOU DO!
X1 or RX1.	READ NUMBER ON SCALE.
X10 OR RX10	MULTIPLY READING BY 10.
X100 OR RX 100.	MULTIPLY READING BY 100.
X1K OR RX1K.	MULTIPLY READING BY 1000.
X10K OR RX10K.	MULTIPLY READING BY 10,000.

(REMEMBER: K = 1000)

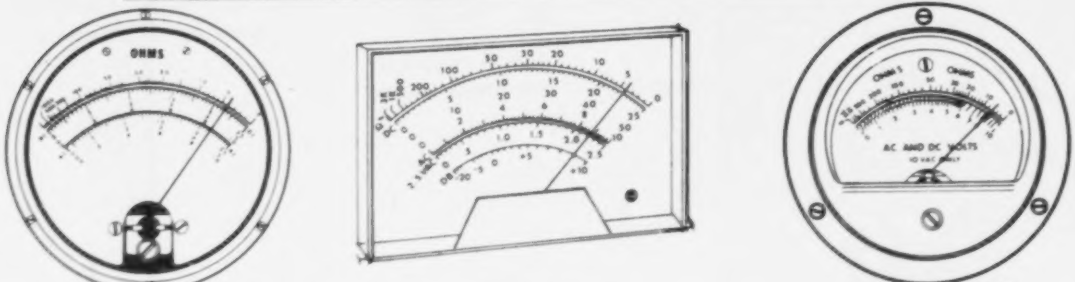
Figure 5-8. Ohms Switch Settings

TA 074696

5-6. TEST EQUIPMENT (Continued).

For example, the meters in fig. 5-9 below show the following readings:

OHMS SWITCH SETTING.	READING.
X1 OR RX1.	4 OHMS.
X10 OR RX10.	40 OHMS.
X100 OR RX100.	400 OHMS.



TS-352 B/U

SIMPSON 160

AN/URM-105

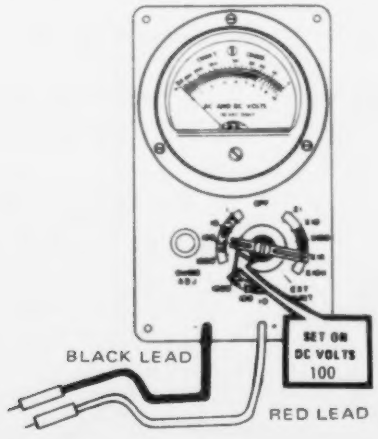
Figure 5-9. OHMS Switch Settings

f. Using the DC Volts Scale. The dc volts scale is used to measure all voltages in the electrical system.

Before using the multimeter to measure dc voltage, do the following steps that match the multimeter you have (fig. 5-10 thru fig. 5-12).

(1) AN/URM-105

Set meter switch to dc volts range given in TM.. (To measure 24 volts dc, set switch on "100 DC VOLTS" range.)



TA 074697

Figure 5-10. Using the DC Volts Scale AN/URM-105

5-6. TEST EQUIPMENT (Continued).

(2) TS-352 B/U

(a) Set FUNCTION switch (1) to DIRECT (range switch can be at any position).

(b) Put black lead in "DC/±AC/OHMS" jack (2).

(c) To measure 24 volts dc, plug red lead into "50V" jack on left side of meter (3). (If measuring less than 10 volts dc, use "10V" jack. If measuring less than 2.5 volts dc, use "2.5V" jack.)

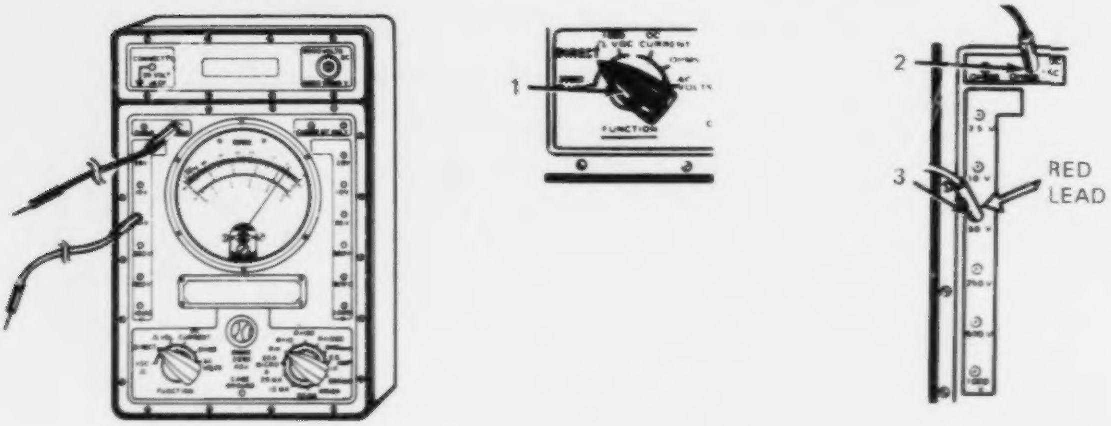


Figure 5-11. Setting the Function Switch TS-352 B/U

(3) SIMPSON 160

(a) Connect black lead to COM- jack.

(b) Connect red lead to + jack.

(c) To measure 24 volts dc, set selector switch to V/DC 50 position. (If measuring less than 10 volts dc, set selector switch to V/DC 10 position. If measuring less than 2.5 volts dc, set selector switch to V/DC 2.5 position.)

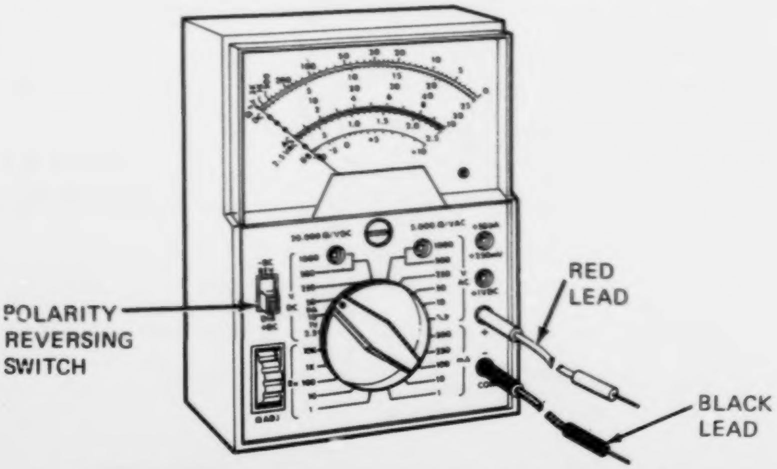


Figure 5-12. Setting the Function Switch Simpson 160

TA 074698

will protect the meter.

g. Measuring DC Voltage. To measure dc volts (fig. 5-13), do the following steps:

(1) Set up multimeter (see para f).

NOTE

If you are not sure of the voltage to be measured on the vehicle, always start on the highest range shown in para f. This will protect the meter.

(2) With any of the three multimeters, connect the red probe to the positive (+) side of the circuit and the black probe to the negative (-) side. The example below shows 24 volts dc being measured across the batteries.

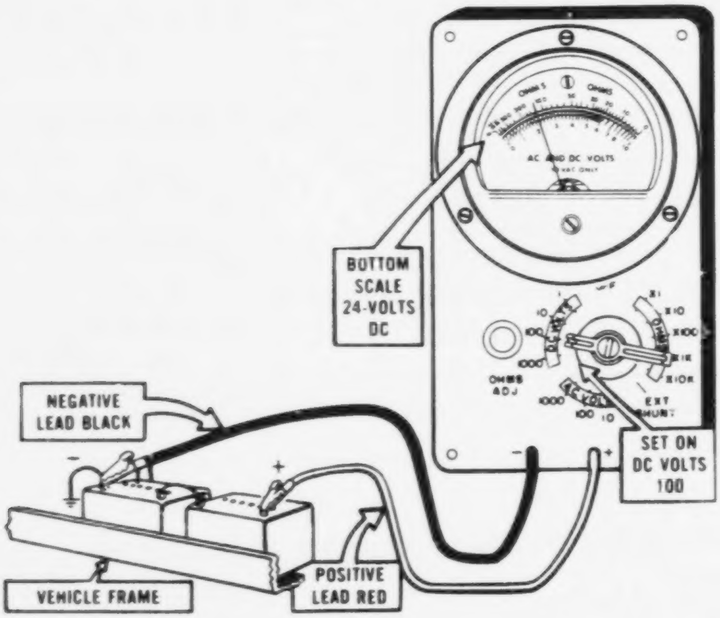

BOTTOM SCALE 24-VOLTS DC
NEGATIVE LEAD BLACK
SET ON DC VOLTS 100
VEHICLE FRAME
POSITIVE LEAD RED
AC AND DC VOLTS
OHMS ADJ
EXT SHUNT
x1
x10
x100
x1K
x10K
1000
100
10
-
+

Figure 5-13. Measuring DC Voltage

(3) Read the meter. (Figures 5-14 thru 5-16 show how to read all three multimeters.) If the needle tries to move off scale to the left, reverse the probes on the circuit.

TA 074699

5-6. TEST EQUIPMENT (Continued).

(a) AN/URM-105

Read the upper, black, straight-lined portion of the AC and DC VOLTS scale for the range the selector switch is set at:

SWITCH SETTING.	SCALE.
1000 DC VOLTS.	0.10 (AND MULTIPLY BY 100).
100 DC VOLTS.	0.10 (AND MULTIPLY BY 10).
10 DC VOLTS.	0.10.
1 DC VOLT.	0.10 (AND MULTIPLY BY 10).

Thus the meter illustrated is showing the following readings:

SWITCH SETTING.	READING.
100 DC VOLTS.	20 VOLTS DC.
10 DC VOLTS.	2 VOLTS DC.
1 DC VOLT.	.2 VOLTS DC.

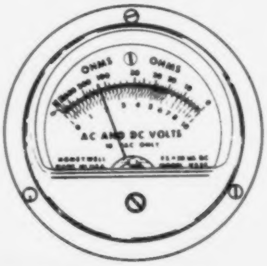


Figure 5-14. Reading DC Volts Scale AN/URM-105

TA 074700

5-6. TEST EQUIPMENT (Continued).

(b) TS-352 B/U.

Read the DC volts scale for the range the red lead is plugged in at:

RANGE.	SCALE.
50V.	0.5 (AND MULTIPLY BY 10).
10V.	0.10.
2.5V.	0.2.5.

Thus the meter illustrated is showing the following readings:

RANGE.	READING.
50V.	20 VOLTS DC.
10V.	4 VOLTS DC.
2.5V.	1 VOLT DC.

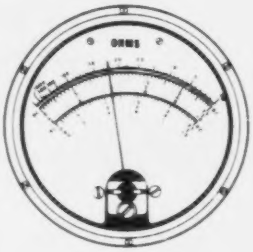


Figure 5-15. Reading DC Volts Scale-TS-352 B/U

(c) SIMPSON 160

Read the "DC VOLTS" scale for the range the selector switch is set at:

SWITCH SETTING.	SCALE.
V/DC 50.	0.50.
V/DC 10.	0.10.
V/DC 2.5.	0.25 (AND DIVIDE BY 10).

Thus the meter illustrated is showing the following readings:

SWITCH SETTING.	READING.
V/DC 50.	20 VOLTS DC.
V/DC 10.	4 VOLTS DC.
V/DC 2.5.	1 VOLT DC.

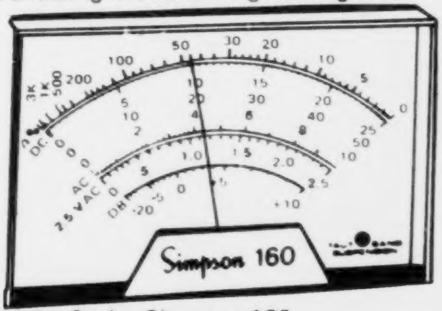

50
30
20
100
10
3K
1K
500
200
5
10
15
5
20
30
20
10
2
4
6
40
8
0
25
50
10
DC
1.0
1.5
2.0
2.5
AC
2.5 VAC
0
-20
-5
0
+10
Simpson 160

Figure 5-16. Reading DC Volts Scale - Simpson 160

TA 074701

5-7. BATTERY SYSTEM.

a. Description. Four 12-volt, heavy-duty, maintenance-free batteries, (fig. 5-17) are located in an enclosure in the right-hand frame rail under the cab. The batteries are connected in a series-parallel combination to provide 24 volts for engine starting plus trailer lighting, and 12 volts for operation of all of the electrical equipment on the vehicle. Water never needs to be added to the maintenance-free batteries. There are no vent plugs in the cover. The batteries are completely sealed except for a small vent hole in the side. The test indicator in the cover can be used to determine if the battery is charged to the proper level for testing.

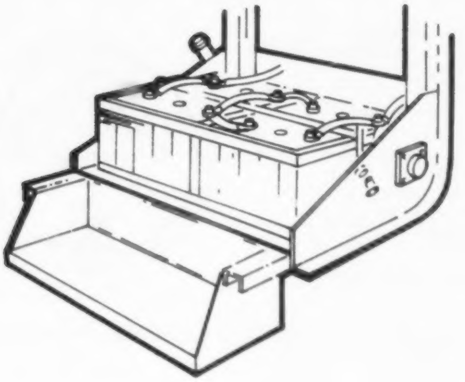


Figure 5-17. Battery System

TA 074702

b. Test Indicator. The test indicator is a built-in hydrometer in one cell which provides visual information for battery testing only. The test indicator will give correct indications only when the battery is relatively level and the top is clean. Under normal conditions, the indicator displays either green or dark to indicate readiness of battery for testing.

(1) Green dot visible. Any green appearance is interpreted as a green dot, which means the battery is ready for testing. On rare occasions following prolonged cranking, the green dot may still be visible. If this should occur, the battery needs charging.

(2) Dark green (dot not visible). The battery needs to be charged prior to testing. On rare occasions the test indicator may turn light yellow. In this case, the battery must be replaced and the vehicle charging system should be checked out.

WARNING

Do not charge, test, or jump start a battery when a light yellow color appears in the test indicator as the battery may explode, squirt electrolyte from the vent hole, and/or damage the charging system of this vehicle.

c. The negative terminals of the battery combination (fig. 5-18) are connected to the ground connector of the starting motor and from there to the engine, tractor frame, and cab (ground). The 24-volt cable of the battery combination is connected to the starting solenoid relay. When the relay contacts are closed, 24-volt power is routed to the starter motor. The 12-volt cable is connected to the alternator and to two circuit breakers for 12-volt distribution.

Table 5-1. Battery System Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		ALL ELECTRICAL SYSTEMS ARE WEAK.				
	1	Inspect battery terminals.	a. Loose.	Tighten.		
			b. Corroded or dirty.	Clean.	Go to Step 2.	
	2	Inspect battery cases.	a. Cracked or broken.	Replace (para 5-38).	Go to Step 3.	
	3	Inspect cables.	a. Frayed or broken.	Replace (para 5-39).		
			b. Corroded.	Clean	Go to Step 4.	
	4	Check battery test indicators.	a. Green.	Test (Malf 2, Step 2).		
			b. Dark.	Charge (para 5-38).		
			c. Yellow	Replace (para 5-38).		Troubleshoot charging system (table 5-5).
			NOTE A defective battery in the series parallel configuration will adversely affect the charge of the other batteries.			
2		ENGINE FAILS TO CRANK OR CRANKS SLOWLY.				
	1	Check battery test indicators.	a. Green.	Test (para 5-38).		
			b. Dark.	Charge (para 5-38).		
			c. Yellow.	Replace (para 5-38).		Troubleshoot charging system (table 5-5).
	2	Test batteries under load. a. Disconnect connector on fuel shutoff valve.				

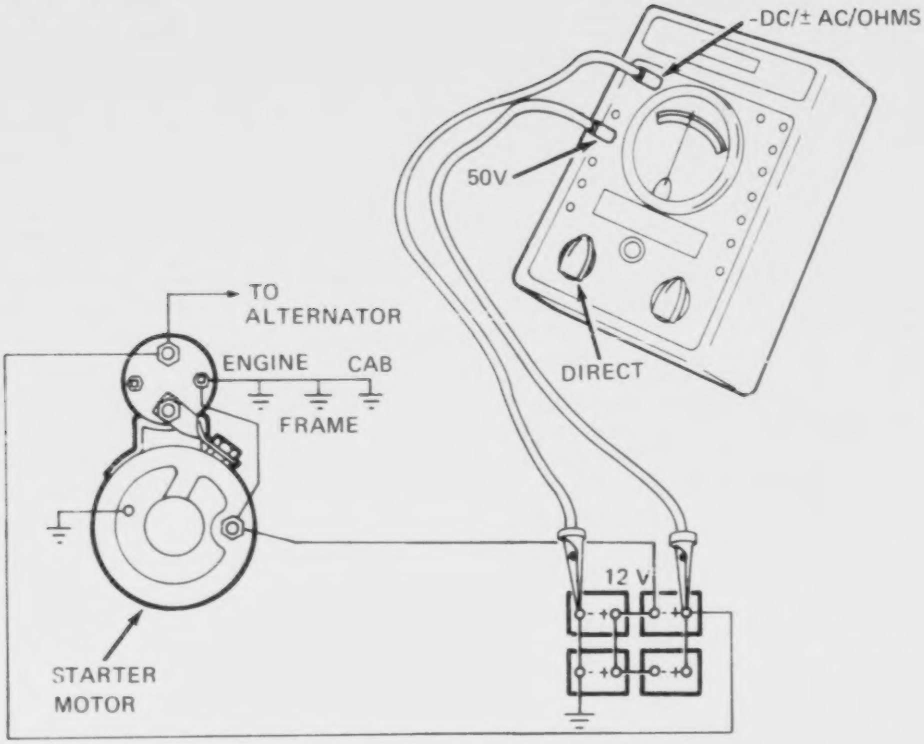
Table 5-1. Battery System Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
2		ENGINE FAILS TO CRANK OR CRANKS SLOWLY (Continued).				
	2	Test batteries under load (Continued).				
		b. Crank engine for approximately 15 seconds to remove battery surface charge.				
		c. Connect a multimeter as shown in Figure 5-18.				
		d. Have an assistant crank the engine for 15 seconds.				
		e. Observe voltmeter.	24 volts DC nominal.	Troubleshoot starting circuit (table 5-2).	Remove and test each battery (para 5-38).	
		NOTE If the engine will not crank, perform the following steps.				
		f. Disconnect the battery cables and jumper to a known good source, such as another vehicle.				
		g. Connect the multimeter as before, except on the jumper batteries.				
		h. Have an assistant crank the engine for 15 seconds.				
		i. Observe voltmeter.	24 volts DC nominal.	Troubleshoot starting circuit (table 5-2).	Remove and test each battery (para 5-38).	
3		BATTERIES DO NOT HOLD A CHARGE.				
	1	Check vehicle lights.	On.	Turn Off.	Go to step 2.	

Table 5-1. Battery System Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		BATTERIES DO NOT HOLD A CHARGE (Continued).				
	2	Check for shorts to ground as follows:				
		a. Disconnect battery ground cable at battery.				
		b. Set multimeter to at least 30 volts DC.				
		c. Turn off all electrical systems.				
		d. Connect red test lead to disconnected ground cable and black test lead to the battery negative terminal.	Any voltage indication.	Go to Step f.	Go to Step g.	
		e. Observe meter.				
		f. Disconnect connector to each circuit breaker, one at a time, until meter drops to 0 volt.	0 voltage indication.	Check wire connection.		
		g. Disconnect devices on that circuit one at a time until meter drops below 4 volts.	0 voltage.	Replace defective component.		

Table 5-1. Battery System Troubleshooting (Continued).


-DC/± AC/OHMS
50V
DIRECT
TO
ALTERNATOR
ENGINE
CAB
FRAME
STARTER
MOTOR
12 V

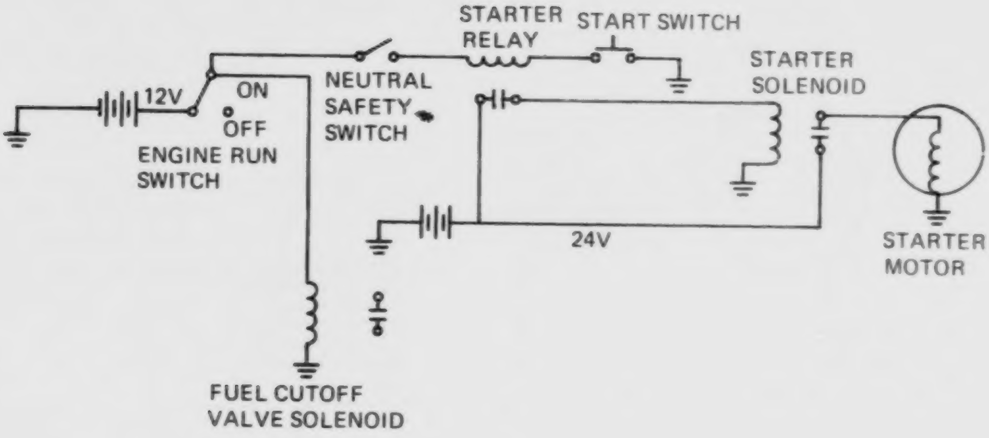
TA 074703

Figure 5-18. DC Voltage Tests

5-8. STARTING SYSTEM CIRCUIT.

a. Description (fig. 5-19). The starting system consists of two sets of 12-volt batteries (connected in series/parallel to provide 24 volts for starting), a starter motor and solenoid, a starter relay, a neutral safety switch, a key switch (ENGINE RUN), and a start button. When the ENGINE RUN switch is turned ON, the fuel solenoid valve is opened and power is applied to one side of the ENGINE START switch. When the transmission ratio selector is in neutral (N) (closing the neutral safety switch), the starter relay is energized and 24 volts dc is applied to the starter solenoid coil. Starter solenoid contacts then close and apply 24 volts to the starter motor. When the engine starts, an overrunning clutch in the starter motor allows the motor to run free until the ENGINE RUN switch is released, thus removing 24-volt power from the starter motor.

b. Troubleshooting the Starting System Circuits. When you suspect a starting system circuit problem, perform the steps in table 5-2.


STARTER RELAY
START SWITCH
STARTER SOLENOID
12V
ON
OFF
ENGINE RUN SWITCH
NEUTRAL SAFETY SWITCH
24V
STARTER MOTOR
FUEL CUTOFF VALVE SOLENOID

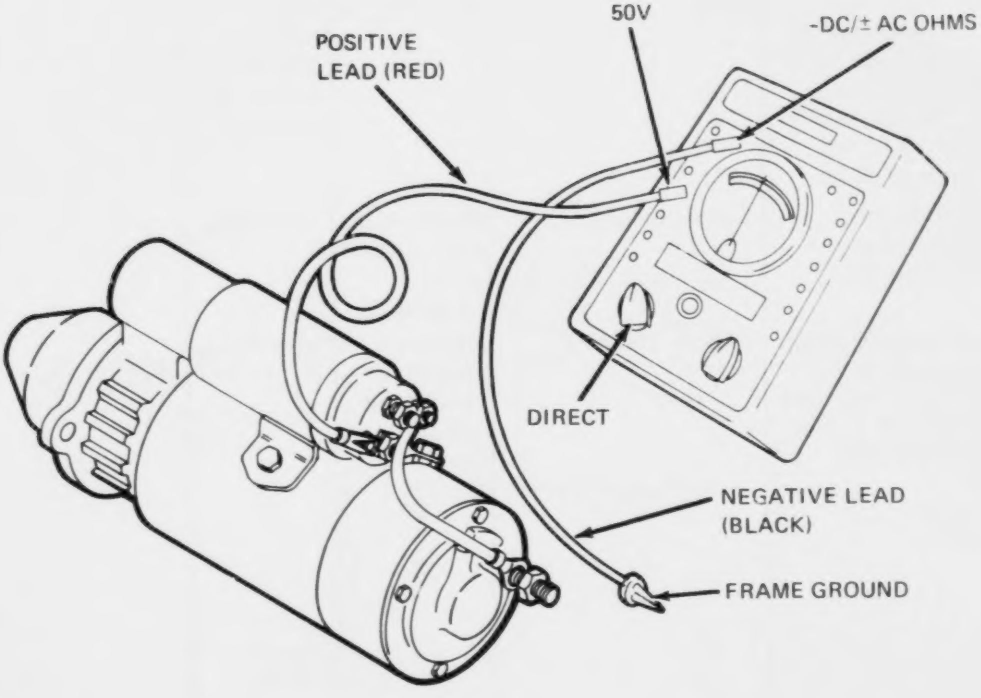
TA 074704

Figure 5-19. Starting System Circuit (Simplified Schematic)

Table 5-2. Starter System Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY.				
	1	Turn on ignition key switch and check voltmeter (TM 9-2320-273-10).	Normal reading.	Go to Step 2.	Troubleshoot battery charging circuit (para 5-11).	
	2	Push engine run button and have an assistant listen for heavy thump of the solenoid switch on the starting motor.	Thump.	Go to Step 4.	Check wiring to starter relay. Go to Step 3.	
	3	Push engine run button and have an assistant listen for a click of the starter relay located behind the center of the instrument panel.	Click.	Go to Step 4.	Check wiring to START switch. Go to Step 4.	
	4	Feel all battery, starter, and starter relay terminals.	Excessive heat.	Repair or replace cables or connectors.	Go to Step 5.	
	5	Check starting solenoid switch with multimeter as shown (figure 5-20), while cranking engine.	24 volts (nominal).	Replace motor and/or solenoid switch (para 5-32).	Go to Step 6.	

Table 5-2. Starter System Circuit Troubleshooting (Continued).


50V
-DC/± AC OHMS
POSITIVE LEAD (RED)
DIRECT
NEGATIVE LEAD (BLACK)
FRAME GROUND

TA 074705

Figure 5-20. Starting Solenoid Switch Checks

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued).				
	6	Check starter relay with multimeter as shown (figure 5-21), while cranking engine.				
		a. Terminal C.	12 Volts (nominal).	Go to (b).	Check wiring to neutral safety switch. Go to Step 7.	
		b. Terminals A and B.	24 Volts (nominal).	Repair wiring to starting motor.	Replace relay (para 5-33).	

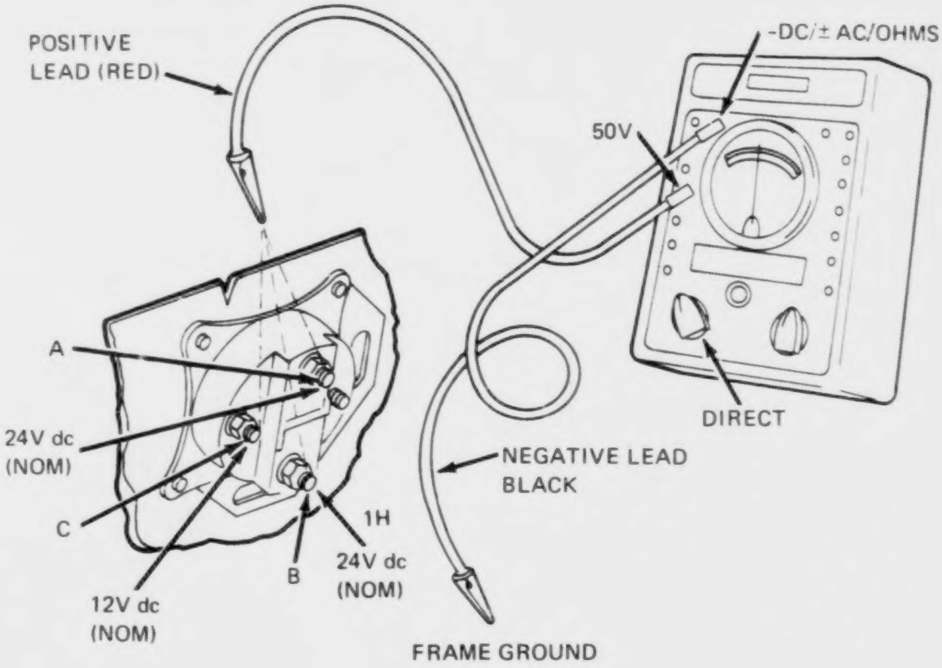

POSITIVE LEAD (RED)
-DC/± AC/OHMS
50V
A
24V dc (NOM)
C
12V dc (NOM)
B
1H
24V dc (NOM)
DIRECT
NEGATIVE LEAD BLACK
FRAME GROUND

Figure 5-21. Starter Relay Checks

TA 074706

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued).				
	7	Check operation of the transmission ratio selector neutral safety switch with multimeter as shown (figure 5-22). Check while attempting to crank the engine and the selector in neutral (N).				
		Terminal No. 4.	12 volts (nominal).		Check wiring to engine run switch.	
		Terminal No. 3.	12 volts (nominal).	To Step 8.	Replace neutral safety switch (para 5-75).	

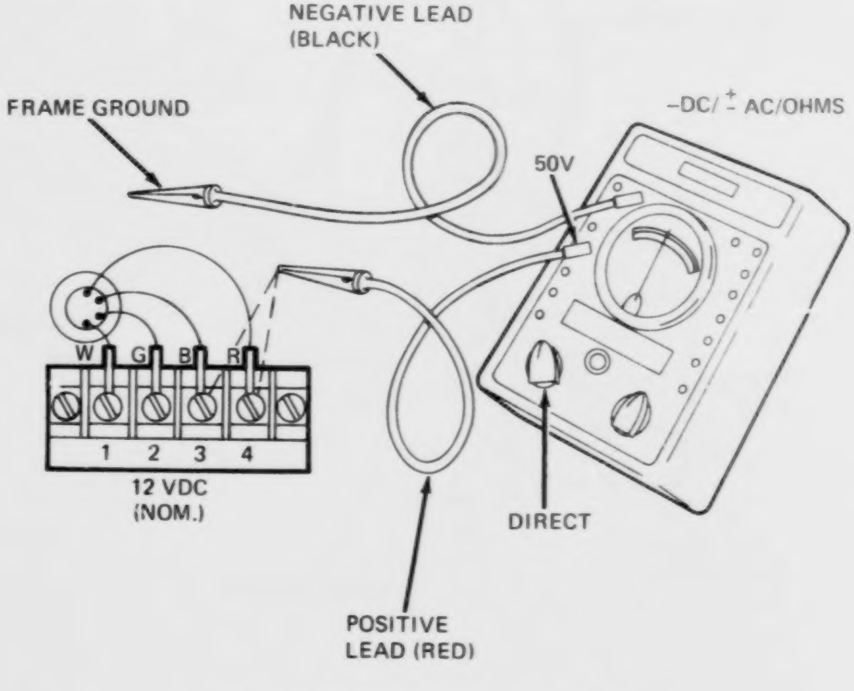

NEGATIVE LEAD (BLACK)
FRAME GROUND
–DC/ ± AC/OHMS
50V
W
G
B
R
1
2
3
4
12 VDC (NOM.)
DIRECT
POSITIVE LEAD (RED)

Figure 5-22. Neutral Safety Switch Checks

TA 074707

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued).				
	8	a. Check operation of the ENGINE RUN switch with multimeter as shown in (figure 5-23). Check for 12 volts nominal on the side of the switch that is wired to the starter relay while pushing the button.	12 volts nominal.	Go to Step 9.	Check wiring to starter relay. Go to Step 9.	
		b. Check wiring. Refer to wiring diagram and schematic in Appendix D.			Replace ENGINE RUN switch (para 5-35).	

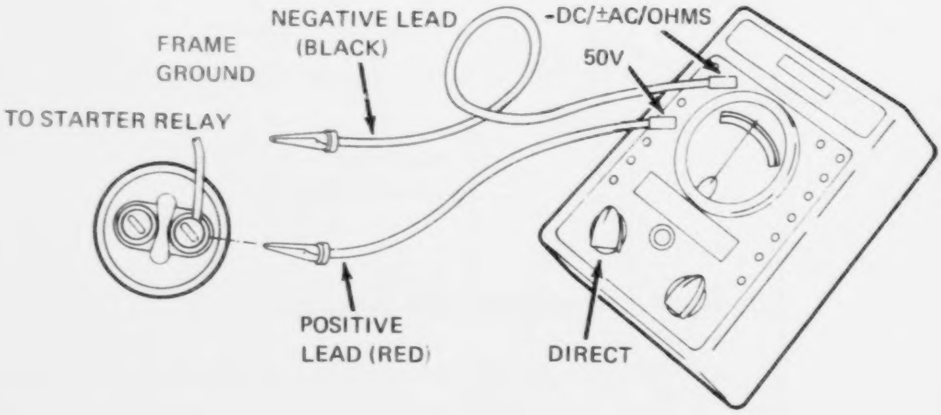

NEGATIVE LEAD (BLACK)
FRAME GROUND
-DC/±AC/OHMS
50V
TO STARTER RELAY
POSITIVE LEAD (RED)
DIRECT

Figure 5-23. ENGINE START Switch Checks

TA 074708

Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued).				
	9	Check ENGINE RUN as follows:				
		a. Remove connector from back of ENGINE RUN switch.				
		b. Install jumper wire as shown in figure 5-24.	Starter motor cranks.	Replace ENGINE RUN switch (para 5-35).	Go to Step 10.	

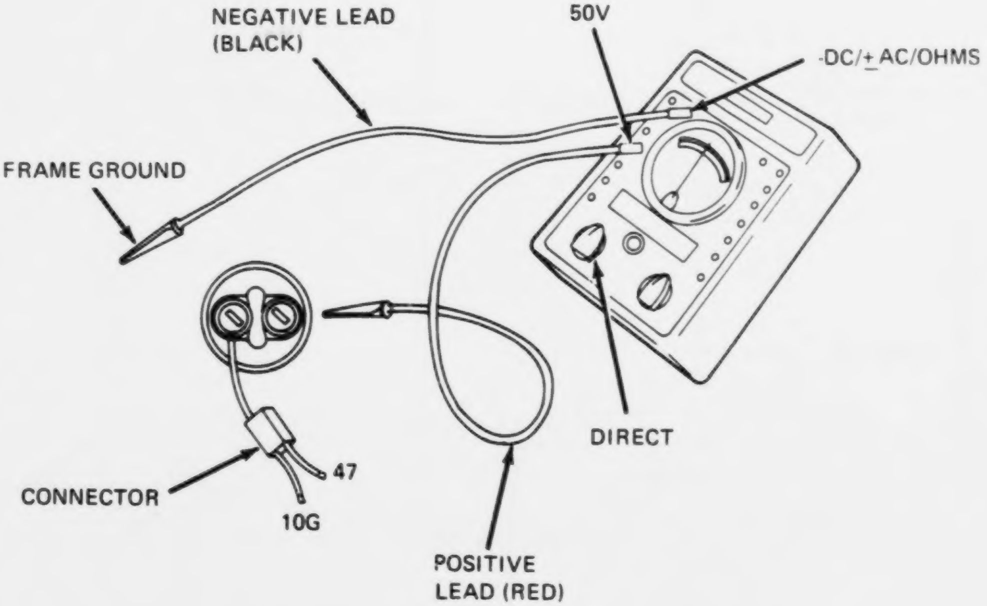
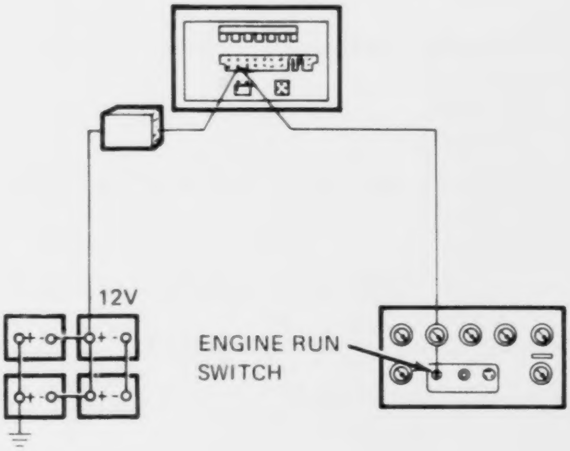

NEGATIVE LEAD (BLACK)
50V
-DC/± AC/OHMS
FRAME GROUND
DIRECT
CONNECTOR
47
10G
POSITIVE LEAD (RED)

Figure 5-24. ENGINE RUN Switch Checks.

TA 074709

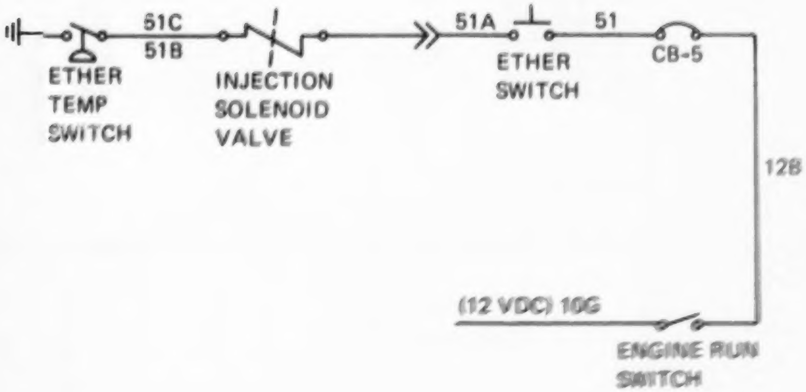
Table 5-2. Starter System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		STARTER FAILS TO CRANK OR CRANKS TOO SLOWLY (Continued).				
	10	Check for loose connections between batteries and the ENGINE RUN switch (circuits shown in figure 5-25).	Loose. Defective.	Tighten. Repair or replace.		
		 *Figure 5-25. Starting Circuit to ENGINE RUN switch.*				
2		STARTING MOTOR IS NOISY AND ENGAGEMENT IS ERRATIC.				
	1	Replace motor and solenoid switch assembly (para 5-32).				TA 074710

5-9. ETHER QUICK-START CONTROLS.

a. *Description (fig. 5-26).* The ether injection solenoid valve is opened to allow ether to flow from the storage canister into the intake manifold when the ETHER button is pushed and released and the ether temperature switch is closed (engine coolant temperature is less than 50°F (10°C).

b. *Troubleshooting.* Perform the steps in table 5-3 to isolate faulty components of the ether quick-start controls.


51C
51B
ETHER TEMP SWITCH
INJECTION SOLENOID VALVE
51A
51
ETHER SWITCH
CB-5
128
(12 VDC) 10G
ENGINE RUN SWITCH

TA 074711

Figure 5-26. Ether Quick-Start Electrical Circuit

Table 5-3. Ether Quick Start Control Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		SOLENOID CANNOT BE HEARD TO CLICK WHEN ETHER BUTTON IS PUSHED.				
	1	Check engine coolant temperature gage.	Below 50°F (10°C).	Go to Step 2.		Solenoid is not supposed to work when coolant is above 50°F
			NOTE The ETHER button must be pushed and released when performing the following checks.			
	2	Check for voltage at circuit 51 terminal of ETHER switch.	12 voltage nominal.	Go to Step 3.	Check circuit breaker (para 5-5) and wiring.	
	3	Check for voltage at circuit 51A terminal of ETHER switch.	12 volts dc nominal.	Go to Step 4.	Replace switch (para 5-74).	
	4	Check for voltage at circuit 51B terminal of solenoid.	12 volts dc nominal.	Go to Step 5.	Repair wiring or connections.	
	5	Check for voltage at circuit 51C terminal of solenoid.	12 volts dc nominal.	Go to Step 6.	Replace solenoid.	
	6	Check for voltage at terminal of ETHER temperature switch.	12 volts dc nominal.	Replace switch (para 5-74).	Repair wiring or connections.	

5-10. ENGINE RETARDER CONTROLS.

a. Description. The engine retarder solenoid valves are applied by the foot switch as selected by the three-position ENGINE RETARDER switch (fig. 5-27). The operator must let up on the foot throttle to close the throttle position sensing switch.

b. Troubleshooting the Engine Retarder Control. Perform the steps in table 5-4 to isolate faulty components of the engine retarder circuit.

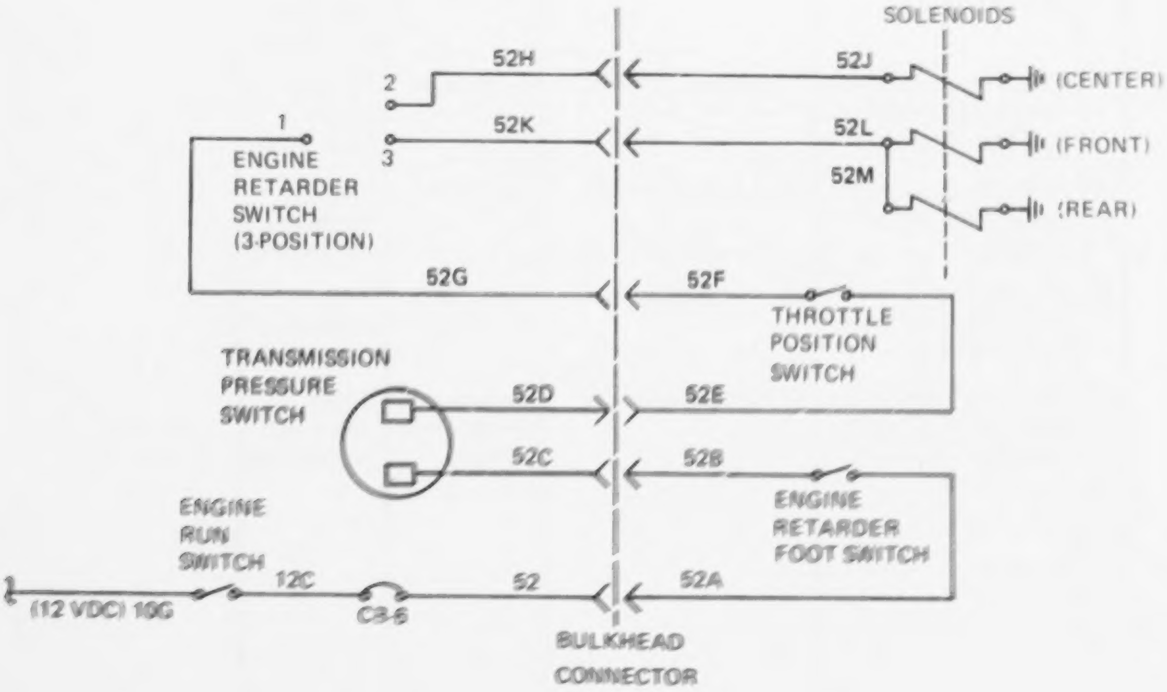

SOLENOIDS
52H
52J
(CENTER)
2
1
52K
52L
(FRONT)
3
ENGINE
RETARDER
SWITCH
(3-POSITION)
52M
(REAR)
52G
52F
THROTTLE
POSITION
SWITCH
TRANSMISSION
PRESSURE
SWITCH
52D
52E
52C
52B
ENGINE
RETARDER
FOOT SWITCH
ENGINE
RUN
SWITCH
12C
52
52A
(12 VDC) 10G
CB-6
BULKHEAD
CONNECTOR
TA237220

Figure 5-27. Engine Retarder Control Circuit

Table 5-4. Engine Retarder Control Circuit Troubleshooting.

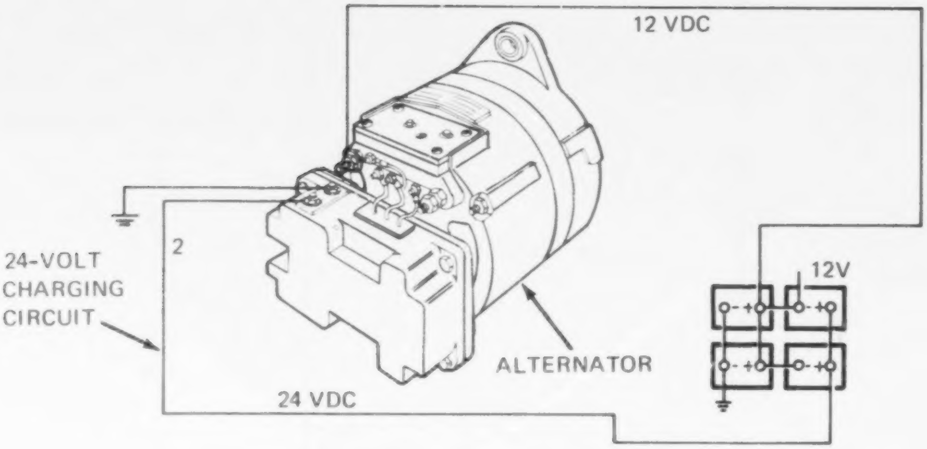
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		NO RETARDING ACTION.				
	1	With ENGINE RUN switch on, check for voltage to retarder foot switch (circuit 52A).	12 volts dc nominal.	Go to Step 2.	Check for faulty circuit breaker (para 5-5C).	
			NOTE Before making the voltage checks described in steps 2 through 8, do the following: Apply parking brake. Check system air pressure. Activate transmission control group. Put transmission in gear. Press and hold engine retarder foot pedal during voltage checks.			
	2	Check for voltage at circuit 52B terminal of foot retarder switch.	12 volts dc nominal.	Go to Step 3.	Replace switch.	
	3	Check for voltage at circuit 52C terminal of transmission pressure switch.	12 volts dc nominal.	Go to Step 4.	Repair wiring between 52B and 52C.	
	4	Check for voltage at circuit 52D terminal of transmission pressure switch.	12 volts dc nominal.	Go to Step 5.	Drain system air pressure and replace switch.	
	5	Check for voltage at circuit 52E terminal of throttle position sensing switch.	12 volts dc nominal.	Go to Step 6.	Repair wiring (52D, 52E) or connections.	
	6	Check for voltage at circuit 52F terminal of throttle position sensing switch.	12 volts dc nominal.	Go to Step 7.	Replace switch.	
	7	Check for voltage at circuit 52G terminal of panel ENGINE RETARDER switch.	12 volts dc nominal.	Go to Step 8.	Repair wiring (52F, 52G) or connections.	

Table 5-4. Engine Retarder Control Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		NO RETARDING ACTION (Continued).				
	8	Check for voltage at circuit 52H and 52K terminals of panel ENGINE RETARDER switch with switch in HIGH position.	12 volts dc nominal.	Go to Step 9.	Replace switch.	
	9	Check for voltage at each solenoid valve, circuits 52J, 52L and 52M.	12 volts dc nominal.	Refer to Direct Support Maintenance.	Repair wiring (52J, 52L, 52M) or connections.	

5-11. BATTERY CHARGING CIRCUIT.

a. Description. Charging of the batteries is accomplished by a 14-volt, 85-ampere, self-load limiting alternator with an integral transformer rectifier providing 24 volts for the cranking batteries and 12 volts for other vehicle electrical loads. This system uses two sets of 12-volt batteries in series to provide 24 volts for cranking. The cranking batteries are charged by the transformer rectifier unit, and as the load demand on these batteries is cranking only, the 15 amperes available from the transformer rectifier is more than sufficient for this application. As the cranking batteries become charged, the output current gradually drops to approximately one ampere when the terminal voltage of the battery reaches 13.8 volts (adjustable). The charging circuit is shown in figure 5-28.



TA 074713

Figure 5-28. Battery Charging Circuit

Table 5-5. Battery Charging Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		BATTERIES ARE BEING UNDERCHARGED OR OVERCHARGED.				
	1	Check batteries (table 5-1, malfunction 2, step 2).				
	2	Check the alternator drive belts for proper tension (para 4-55).	a. Loose.	Tighten (para 5-43).	Go to Step 3.	
			b. Damaged.	Replace (para 5-43).	Go to Step 3.	
	3	Check all charging circuit wiring and connections.	a. Loose.	Tighten.		
			b. Defective	Repair or replace.		
	4	Refer to Direct Support Maintenance.				

5-12. WARNING LAMPS AND ALARMS.

a. *Description.* The following warning lamps and alarms are employed in this vehicle series:

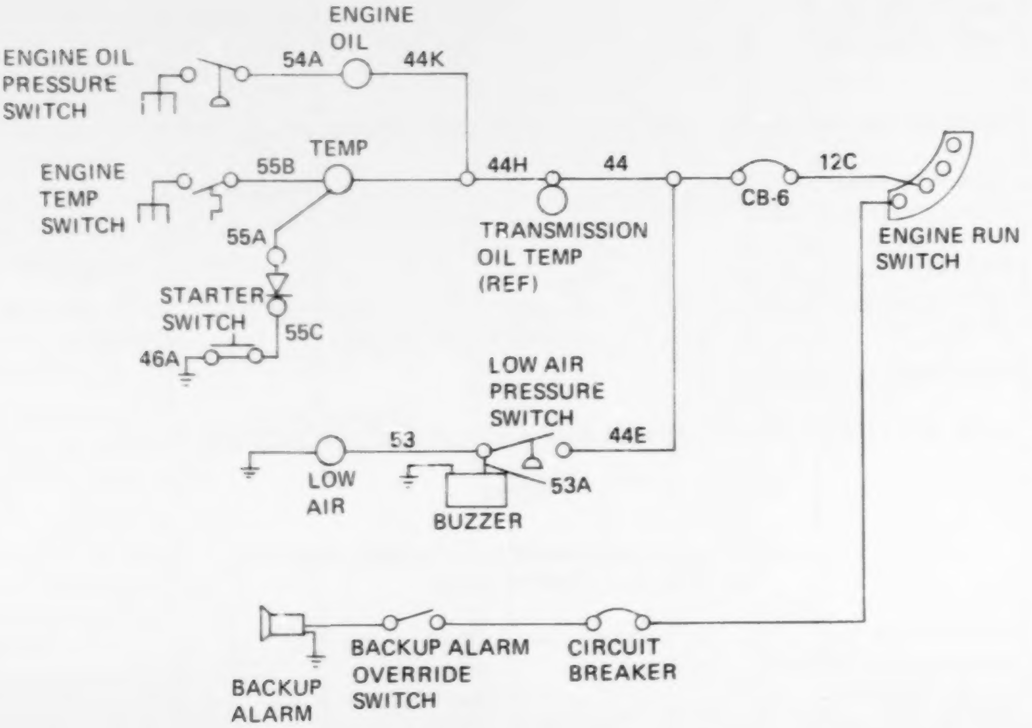
(1) ENGINE TEMPERATURE warning lamp.

(2) ENGINE OIL LOW warning lamp.

(3) LOW AIR PRESSURE warning lamp.

(4) BACKUP ALARM (M916 THRU M920).

The ENGINE TEMPERATURE warning lamp is actuated when the water temperature sensing switch closes (at 225°F, 95°C) if the ignition switch is ON. The ENGINE OIL LOW warning lamp is actuated when the engine oil pressure sensing switch closes (at 5 psi, 100 kPa) if the ignition switch is ON. The LOW AIR PRESSURE warning lamp and buzzer are actuated when the low air switch closes (between 64 and 76 psi) if the ignition switch is ON. The backup alarm goes off when the backup switch is closed and the ignition switch is ON unless the manual backup alarm override switch is open. The circuits for these devices are shown in figure 5-29. Wire connection points and wire identification numbers are indicated.


ENGINE OIL
ENGINE OIL PRESSURE SWITCH
54A
44K
TEMP
ENGINE TEMP SWITCH
55B
44H
44
12C
CB-6
55A
TRANSMISSION OIL TEMP (REF)
ENGINE RUN SWITCH
STARTER SWITCH
55C
46A
LOW AIR PRESSURE SWITCH
53
44E
53A
LOW AIR
BUZZER
BACKUP ALARM
BACKUP ALARM OVERRIDE SWITCH
CIRCUIT BREAKER

TA 074714

Figure 5-29. Warning Lamp and Alarm Circuits

Table 5-6. Warning Lamps and Alarms Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		ENGINE TEMPERATURE WARNING LAMP INOPERATIVE.				
	1	Press START switch.	Lamp lights.	Replace water temperature switch (para 5-73).	Replace the bulb.	
	2	Attach test lead between the ground side of the bulb (circuit 6A) and ground and turn on the ENGINE RUN switch.	Lamp lights.	Replace water temperature switch (para 5-73).	Go to Step 3.	
	3	Check the ENGINE lamp when the ENGINE RUN switch is ON.	Lamp lights.	Double check the temperature switch.	Check wiring to circuit breaker.	
	4	Check for faulty circuit breaker No. 6 with multimeter.	12 volts dc nominal.	Repair wiring (circuits 44, 44H, 44J).	Replace circuit breaker.	
2		ENGINE OIL PRESSURE LOW WARNING LAMP INOPERATIVE.				
	1	Attach test lead between the ground side of the bulb (circuit 54A) and ground and turn on the ENGINE RUN switch.	Lamp lights.	Replace the switch (para 5-71).	Replace the bulb.	
	2	Troubleshoot wiring.				
3		LOW AIR PRESSURE WARNING LAMP AND/OR BUZZER INOPERATIVE.				
			NOTE The air pressure must be below 60 psi to perform the following check.			
		Attach a test lead across both terminals on the LOW AIR PRESSURE switch (located on the firewall inside cab at center).	a. Lamp and buzzer operate. b. Lamp only works.	Replace the pressure switch (para 5-81). Replace the buzzer (para 5-80).		

Table 5-6. Warning Lamps and Alarms Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		LOW AIR PRESSURE WARNING LAMP AND/OR BUZZER INOPERATIVE (Continued).				
			c. Buzzer only works.	Replace the bulb (para 5-61).		
			d. Neither lamp nor buzzer operates.	Troubleshoot wiring (refer to schematic in Appendix D).		
4		BACKUP ALARM IS INOPERATIVE.				
			NOTE The compressed air system must be within normal operating pressures to actuate the backup switch.			
	1	Verify the backup alarm override switch is OFF, and the ENGINE RUN switch is ON. Place the ratio selector in one of the reverse gears.				
	2	Check for voltage at the alarm with a multimeter.	12 dc volts nominal.	Go to Step 3.	Go to Step 4.	
	3	Check ground at alarm for loose or dirty ground.	Bad ground.	Repair ground.	Replace the alarm (para 5-78).	
	4	Attach a test lead across the terminals on the backup switch.	Alarm operates.	Replace backup switch (para 5-77).	Go to Step 5.	
	5	Attach a test lead across the terminals on the override switch.	Alarm operates.	Replace switch.	Go to Step 6.	
	6	Troubleshoot wiring through circuit breaker. Refer to schematic in Appendix D.				

5-13. INSTRUMENTS AND INDICATORS.

a. Description. Electrically operated gages and indicators in the cab provide information for operation as follows:

(1) PARK BRAKE lamp.

(2) DIFFERENTIAL LOCKUP lamp.

(3) FUEL LEVEL gage.

(4) POWER TAKEOFF lamp.

(5) WATER TEMP gage.

(6) TRANS OIL TEMP gage.

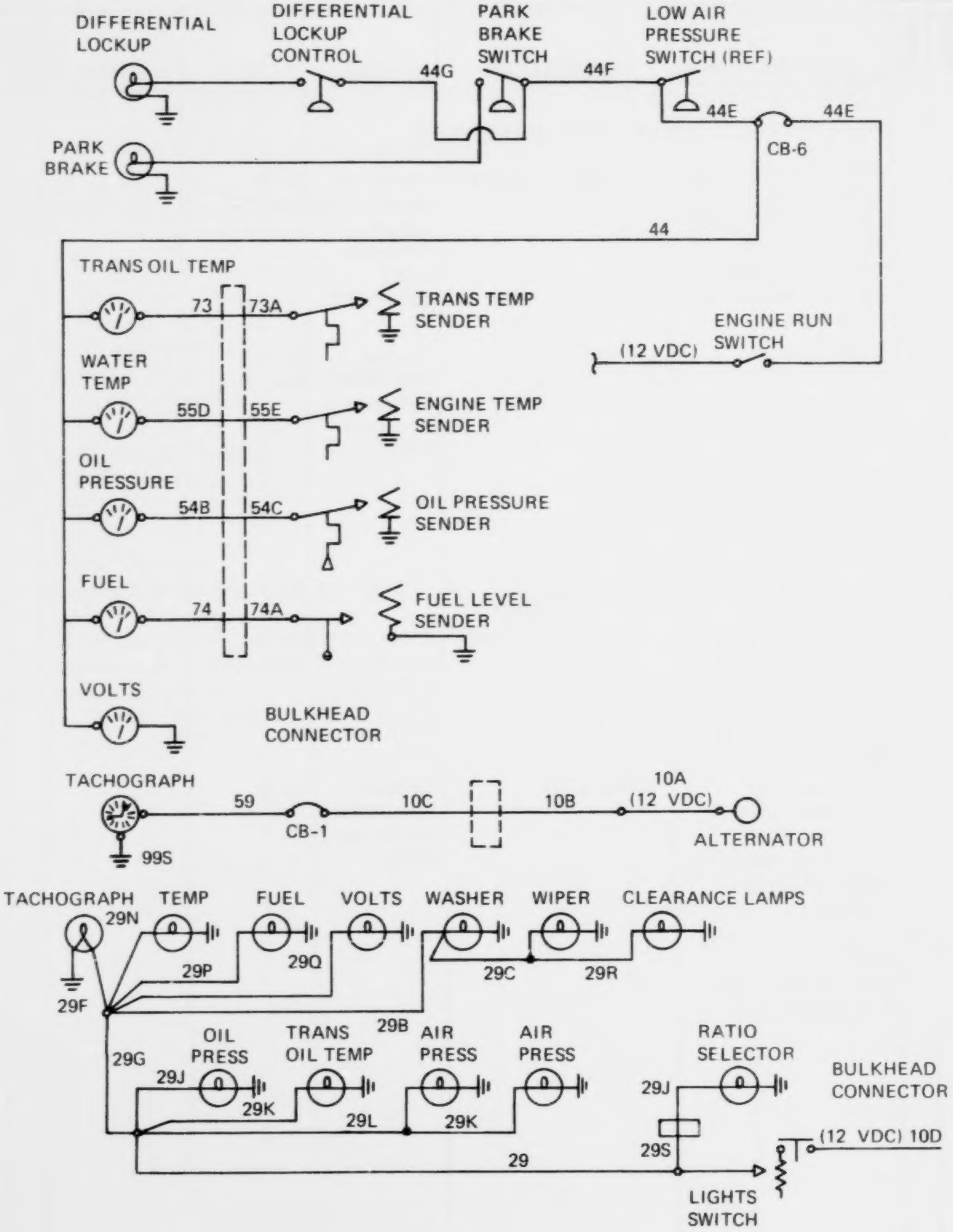
(7) OIL PRESSURE gage.

(8) VOLTS meter.

(9) TACHOGRAPH (clock).

(10) LAMPS.

The circuits for these items are shown in figure 5-30. Wire connection points and wire identification numbers are indicated.


DIFFERENTIAL LOCKUP
DIFFERENTIAL LOCKUP CONTROL
PARK BRAKE SWITCH
LOW AIR PRESSURE SWITCH (REF)
44G
44F
44E
44E
CB-6
PARK BRAKE
44
TRANS OIL TEMP
73
73A
TRANS TEMP SENDER
ENGINE RUN SWITCH
(12 VDC)
WATER TEMP
55D
55E
ENGINE TEMP SENDER
OIL PRESSURE
54B
54C
OIL PRESSURE SENDER
FUEL
74
74A
FUEL LEVEL SENDER
VOLTS
BULKHEAD CONNECTOR
TACHOGRAPH
59
CB-1
10C
10B
10A
(12 VDC)
ALTERNATOR
99S
TACHOGRAPH
TEMP
FUEL
VOLTS
WASHER
WIPER
CLEARANCE LAMPS
29N
29P
29Q
29C
29R
29F
29B
29G
OIL PRESS
TRANS OIL TEMP
AIR PRESS
AIR PRESS
RATIO SELECTOR
BULKHEAD CONNECTOR
29J
29K
29L
29K
29J
29S
(12 VDC) 10D
29
LIGHTS SWITCH

TA 074715

Figure 5-30. Instrument and Indicator Circuits

Table 5-7. Instruments and Indicators Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		DIFFERENTIAL LOCKUP LAMP INOPERATIVE.				
	1	With differential lockup control set to LOCK, and ENGINE RUN switch ON check for voltage to the lamp using a multimeter.	12 volts dc nominal.	Check for good ground at bulb. (Replace bulb) (para 5-63).	Go to Step 2.	
	2	Attach test lead across the differential lockup control terminals.	Lamp lights.	Replace differential lockup control (para 5-83).	Go to Step 3.	
	3	Troubleshoot wiring. Refer to wire diagram and schematic in Appendix D.				
2		PARK BRAKE LAMP INOPERATIVE.				
	1	With park brake applied and ENGINE RUN switch set to ON, use a multimeter to check voltage to the lamp.	12 volts dc nominal.	Check for a good ground at the bulb. (Replace the bulb) (para 5-63).	Go to Step 2.	
	2	Attach test lead across park brake switch terminals (located in instrument panel near circuit breaker).	Lamp lights.	Replace park brake switch (para 5-82).	Go to Step 3.	
	3	Troubleshoot wiring. Refer to wiring diagram and schematic in Appendix D.				

Table 5-7. Instruments and Indicators Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		INSTRUMENT PANEL GAGES INOPERATIVE.				
	1	Check the following gages: Trans oil temp, water temp, oil press, fuel.				
		a. Using a multimeter check for voltage at the gage terminals.	12 volts dc nominal.	Replace gage.	Go to Step b.	
		b. Attach jumper across terminals of sending unit.	Gage operates.	Replace sending unit.	Go to Step c.	
		c. Troubleshoot wiring. Refer to wire diagram and schematic in Appendix D.				
	2	Check volts gage:				
		a. Using a multimeter check voltage at gage terminals.	12 volts dc nominal.	Replace gage.	Go to Step b.	
		b. Troubleshoot wiring Refer to wire diagram and schematic in Appendix D.				

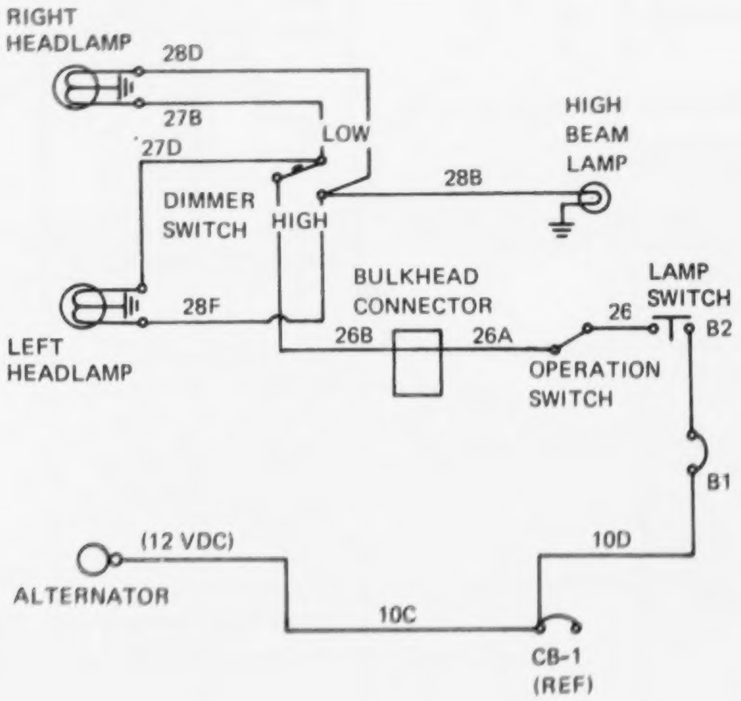
Table 5-7. Instruments and Indicators Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
4		TACHOGRAPH CLOCK IS INOPERATIVE.				
	1	Check circuit 59 using a multimeter.	12 volts dc nominal.	Replace tachograph (para 5-66).	Go to Step 2.	
	2	Check wiring. Refer to diagram and schematic in Appendix D.				
5		INDICATOR/ILLUMINATION LAMP OUT.				
	1	Pull headlamp switch out.	All lamps come on with headlamp switch at full out or half way position.	Go to Step 4	Go to Step 2.	
	2	Check for voltage at the headlamp switch using a multimeter.	12 volts dc nominal.	Replace headlamp switch (para 5-62).	Go to Step 3.	
	3	Check wiring to headlamp switch. Refer to wire diagram and schematic in Appendix D.				
	4	For individual lamps that are out, replace bulb. Turn on headlamp switch.	Lamp comes on.			
	5	Check wiring. Refer to wire diagram and schematic in Appendix D.				

5-14. HEADLAMPS.

a. *Description (fig. 5-31).* The headlamp system uses two sealed-beam lamps which provide separate and distinct high and low beams. A foot-operated dimmer switch controls the use of the high or low beam. The headlamp switch on the instrument panel turns the headlamps ON and OFF. A recycling type circuit breaker in the headlamp switch protects the circuit without a total loss of the headlamps in case of a short.

b. *Troubleshooting the Headlamp Circuit.* Perform the steps in table 5-8 to isolate faulty components of the headlamp circuit.


RIGHT HEADLAMP
28D
27B
27D
LOW
HIGH BEAM LAMP
28B
DIMMER SWITCH
HIGH
BULKHEAD CONNECTOR
LAMP SWITCH
26
B2
28F
26B
26A
LEFT HEADLAMP
OPERATION SWITCH
B1
(12 VDC)
10D
ALTERNATOR
10C
CB-1 (REF)

TA 074716

Figure 5-31. Headlamp Circuit

Table 5-8. Headlamp Circuit Troubleshooting

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		BOTH HEADLAMPS BLINK ON AND OFF				
			NOTE A short in the headlamp circuit is causing the circuit breaker to cycle.			
2		ONE HEADLAMP IS INOPERATIVE.				
		Remove the lamp and check for voltage at the lamp socket with multimeter.	12 volts dc nominal.	Replace lamp (para 5-44).	Repair ground connection at lamp.	
3		BOTH HEADLAMPS ARE INOPERATIVE.				
	1	Check blackout lamp switch position.				
	2	Check for voltage at dimmer switch terminal (circuit 26B) using multimeter.	12 volts dc nominal. Fig. 5-32.	Replace (para 5-57).	Go to Step 3.	
	3	Check for voltage at lamp switch (circuit 26) terminal.	12 volts dc nominal.	Check circuit 26 wiring.	Go to Step 4.	
	4	Check for voltage at lamp switch (circuit 10D) terminal.	12 volts dc nominal.	Replace switch (para 5-62).	Go to Step 5.	
	5	Troubleshoot wiring.				
	6	Check circuit breaker in headlamp switch.	Continuity.	Troubleshoot wiring	Replace headlamp switch.	

Table 5-8. Headlamp Circuit Troubleshooting (Continued).

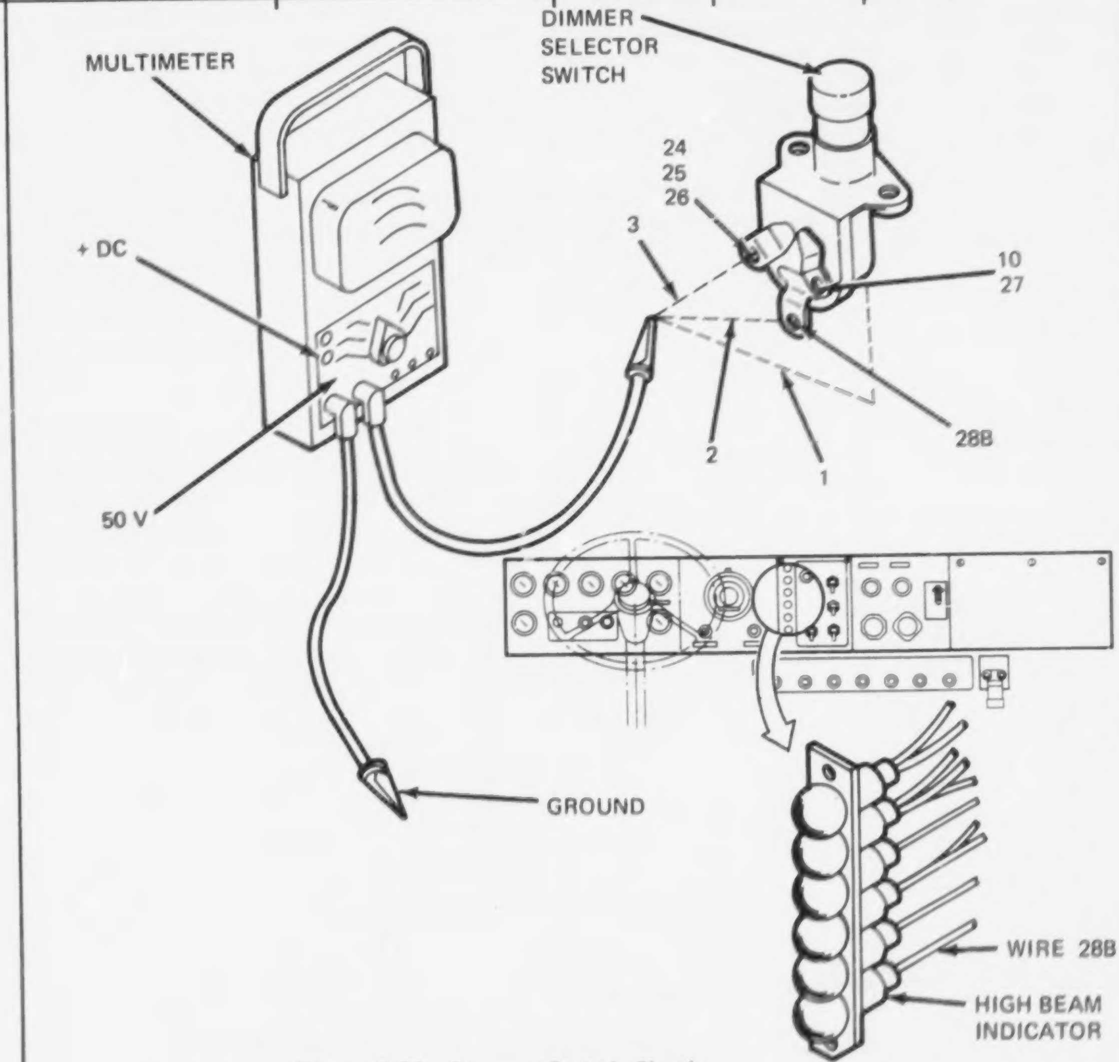

MULTIMETER
DIMMER SELECTOR SWITCH
24
25
26
3
10
27
+ DC
28B
2
1
50 V
GROUND
WIRE 28B
HIGH BEAM INDICATOR

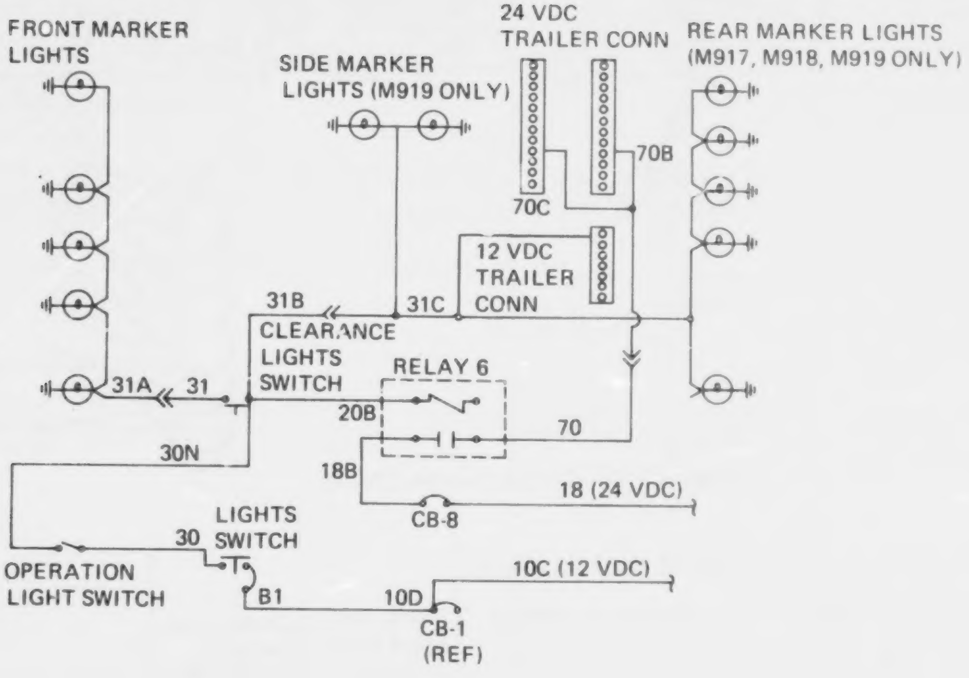
Figure 5-32. Dimmer Switch Checks

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
4		HIGH BEAM INDICATOR IS INOPERATIVE.				
		Check for voltage at lamp and terminal 2 with multimeter.	12 volts dc nominal.	Replace bulb (para 5-63), or switch (para 5-57).	Check wire numbers 24, 25, 26, 10, 27 and 28B from dimmer selector switch at terminals 1, 2, and 3.	TA 074717

5-15. MARKER LAMPS.

a. Description. All vehicles in the series have five front marker lamps. The concrete mixer also has two intermediate side marker lamps. The dump, bituminous distributor, and the concrete mixer also have five rear marker lamps. Wiring to 24 V dc and 12 V dc trailer connectors is also provided. The lamps are turned on by the headlamp switch when the blackout switch is in the normal position. A momentary contact CLEARANCE LAMP switch allows the driver to flash the lamps.

b. Troubleshooting. The marker lamps circuit is straightforward and troubleshooting can, for the most part, be based on observation of the lamp(s) not working and reference to the circuit schematic, figure 5-33. The checks in table 5-9 can be used to isolate a problem.


FRONT MARKER LIGHTS
SIDE MARKER LIGHTS (M919 ONLY)
24 VDC TRAILER CONN
REAR MARKER LIGHTS (M917, M918, M919 ONLY)
70B
70C
12 VDC TRAILER CONN
31B
31C
CLEARANCE LIGHTS SWITCH
RELAY 6
31A
31
20B
70
30N
18B
18 (24 VDC)
CB-8
LIGHTS SWITCH
30
OPERATION LIGHT SWITCH
B1
10D
10C (12 VDC)
CB-1 (REF)

TA 074718

Figure 5-33. Marker Lamps Circuit

Table 5-9. Marker Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		FRONT MARKER LAMPS INOPERATIVE.				
		If none of the front marker lamps operates, check wiring from the switch.	Loose connection. Broken wire.	Tighten. Repair.	Replace any single lamp that is inoperative.	
2		INTERMEDIATE MARKER LAMPS INOPERATIVE.				
		If neither of the side marker lamps operate, check wiring from the switch.	Loose connection. Broken wire.	Tighten. Repair.	Replace bulb.	
3		REAR MARKER LAMPS INOPERATIVE.				
		If none of the rear marker lamps operates, check wiring from the switch.	Loose Connection. Broken wire.	Tighten. Repair.	Replace bulb.	
4		ALL MARKER LAMPS INOPERATIVE.				
		Check for voltage at both switch terminals using multimeter.	12 volts dc nominal.	Troubleshoot wiring.	Replace switch.	

5-16. PARKING AND TAIL LAMPS.

a. *Description.* The (front) parking and (rear) tail lamps are combination lamps which also provide stop and turn functions. The parking and tail lamp functions are actuated by the headlamp switch when it is pulled either halfway or all the way out (fig. 5-34).

b. *Troubleshooting.* Troubleshooting is indicated directly as the result of the observed malfunction as described in table 5-10.

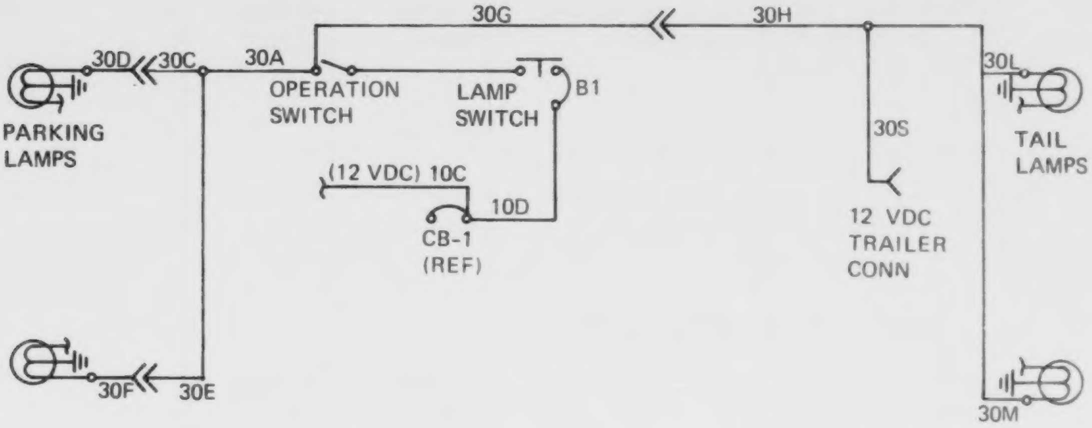

30G
30H
30D
30C
30A
OPERATION SWITCH
LAMP SWITCH
B1
PARKING LAMPS
(12 VDC) 10C
10D
CB-1 (REF)
30S
12 VDC TRAILER CONN
30L
TAIL LAMPS
30F
30E
30M

Figure 5-34. Parking and Tail Lamp Circuit

TA 074719

Table 5-10. Parking and Tail Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		SINGLE LAMP INOPERATIVE.				
		Replace bulb.	Lamp lights.		Check wiring.	
2		FRONT LAMPS ARE INOPERATIVE.				
		Check circuits 30C, 30D, 30E, and 30F wiring and connection points, using a multimeter.				
3		REAR LAMPS ARE INOPERATIVE.				
		Check circuits 30L, and 30M wiring and connection points, using a multimeter.				

5-17. STOP AND TURN SIGNAL LAMPS.

a. *Description.* The turn signal and stop lamps (fig. 5-35) are combination lamps which also provide the parking and tail lamp functions. Referring to figure 5-35, you will see that circuits 35B and 36C provide the right turn directional flashing when the control handle is raised. Circuits 37 and 37F provide the left turn directional flashing when the control lever is lowered. The hazard lamps use those same circuits simultaneously to provide flashing of all four lamps. The stop lamp switch completes circuit 25 to actuate circuits 36C and 37F which provide the stop lamp function. The flashing functions override the stop and park functions. The flashing lamps on the control operate in conjunction with the flashing circuits (refer to table 5-11).

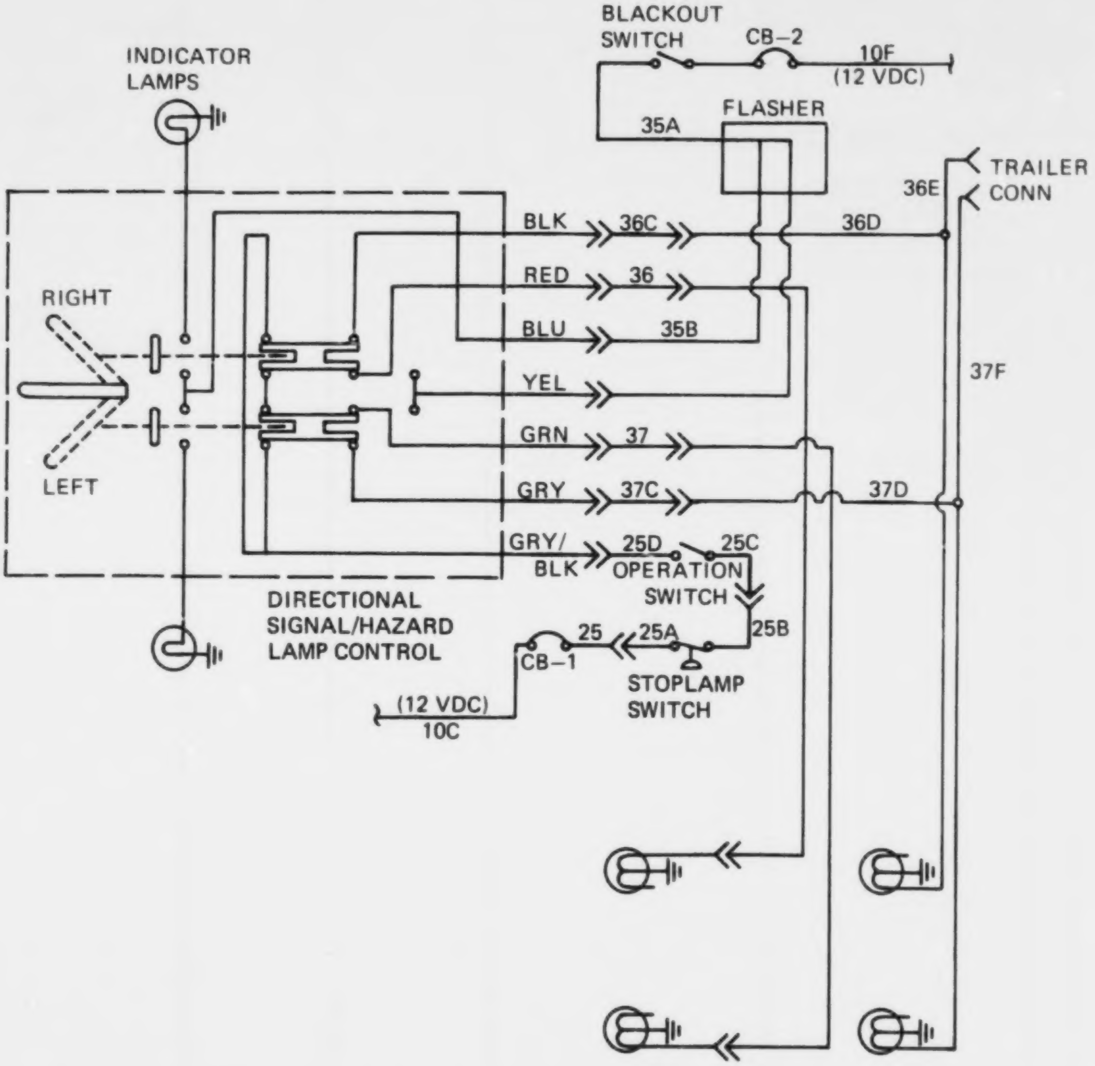

BLACKOUT SWITCH
CB-2
10F (12 VDC)
INDICATOR LAMPS
FLASHER
35A
TRAILER CONN
36E
BLK
36C
36D
RED
36
RIGHT
BLU
35B
YEL
37F
GRN
37
LEFT
GRY
37C
37D
GRY/BLK
25D
25C
OPERATION SWITCH
DIRECTIONAL SIGNAL/HAZARD LAMP CONTROL
25
25A
25B
CB-1
STOPLAMP SWITCH
(12 VDC)
10C
TA 074720

Figure 5-35. Stop and Turn Signal Lamp Circuit.

Table 5-11. Stop and Turn Signal Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
			NOTE If any single lamp does not operate, try replacing the lamp bulb first. Likewise, if lamps in different circuits fail, replace the lamp bulbs first. When replacing any lamp bulb, clean the socket contacts and check for a good ground. If a lamp bulb is not the problem, proceed as follows. Be sure the ignition key switch is ON when checking the stop or park functions.			
1		TURN SIGNALS INOPERATIVE.				
	1	Jumper across the terminals of the flasher (P to L).	Lamp lights.	Replace flasher.	Go to Step 2.	
	2	Check circuit wiring and circuit breaker, using multimeter.	12 volts dc nominal.	Go to Step 3.	Repair/ replace.	
	3	Check for voltage at turn signal control connector.	12 volts dc nominal.	Replace control (para 5-58).	Repair wiring.	
	4	If the stop lamps work, but the rear directionals do not, replace the directionals control.				
2		STOPLAMPS ARE INOPERATIVE.				
			NOTE Air pressure must be normal for the stoplamps to operate.			
	1	If the turn signals work but the stop lamps do not, check for voltage on both terminals of the stoplamp switch while the brake pedal is being depressed.	12 volts dc nominal.	Go to Step 2.	Checking wiring to switch, then replace switch (para 5-85).	
	2	Check circuit 25 wiring.				

5-18. BACKUP LAMPS.

a. *Description (fig. 5-36).* When the ratio selector is placed in either reverse speed, the air-actuated backup switch (located on the transmission) will close and light up the backup lamps if the ENGINE RUN switch is turned on and the blackout switch is in the normal position. (Reference Table 5-12.)

NOTE

The compressed air system must be charged within the normal operating range in order to shift the transmission and actuate the backup switch.

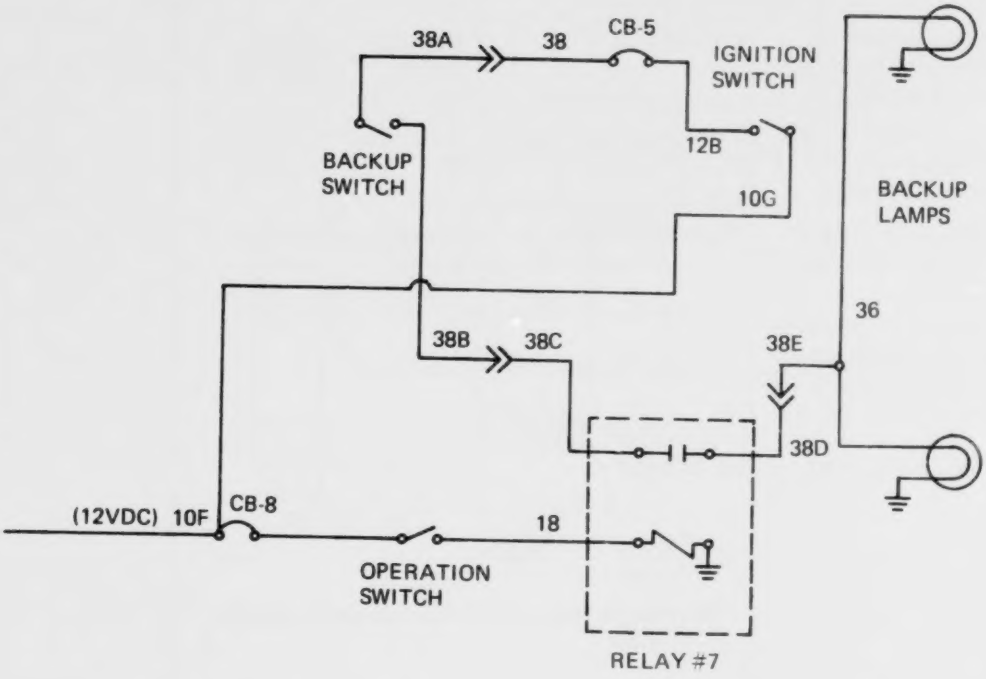

38A
38
CB-5
IGNITION
SWITCH
12B
BACKUP
SWITCH
10G
BACKUP
LAMPS
36
38B
38C
38E
38D
(12VDC) 10F
CB-8
18
OPERATION
SWITCH
RELAY #7

Figure 5-36. Backup Lamp Circuit.

TA 074721

Table 5-12. Backup Lamps Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		BACKUP LAMP(S) INOPERATIVE.				
	1	Check for voltage at inoperative lamp using multimeter.	12 volts dc nominal.	Check ground, replace bulb (para 5-46).	Go to Step 2.	
	2	Check for voltage at circuit 38B terminal of backup switch.	12 volts dc nominal.	Go to Step 3.	Check circuit 38B wiring.	
	3	Check for voltage at circuit 38A terminal of backup switch.	12 volts dc nominal.	Replace switch (para 5-77).	Check circuit 38A wiring and circuit breaker.	

5-19. BLACKOUT LIGHTING SYSTEM.

a. The blackout lighting system is shown and pictorially described in paragraphs 2-50 and 2-51. See illustration in paragraph 2-51 for location of the major components in this system.

b. To aid in troubleshooting, a schematic diagram (fig. 5-37) is provided below that isolates the blackout lighting system from the complete vehicle electrical system. You will find the vehicle electrical schematic diagram in Appendix D, along with the vehicle wiring harness drawings.

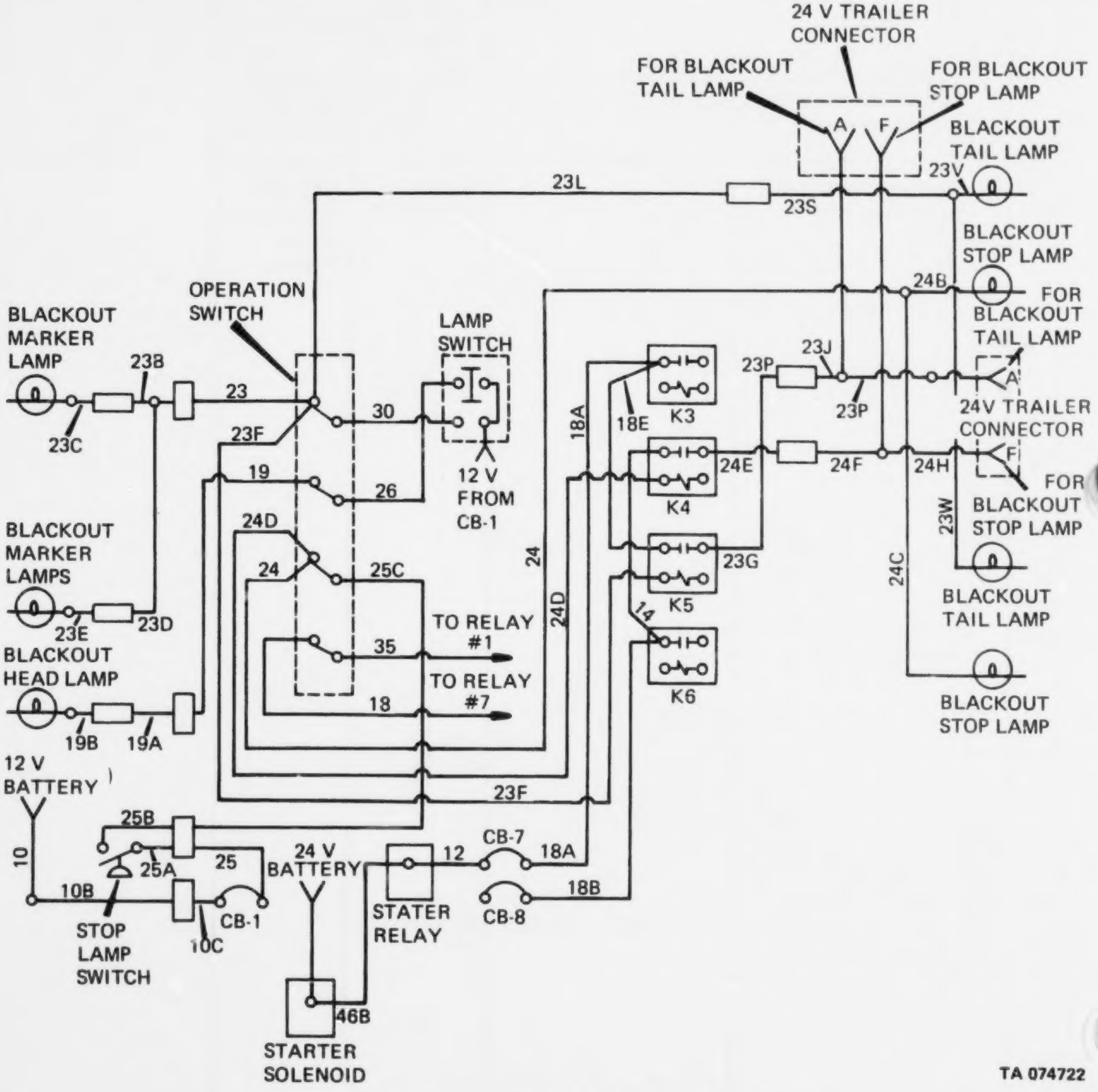

24 V TRAILER CONNECTOR
FOR BLACKOUT TAIL LAMP
FOR BLACKOUT STOP LAMP
A
F
BLACKOUT TAIL LAMP
23V
23L
23S
BLACKOUT STOP LAMP
24B
FOR BLACKOUT TAIL LAMP
OPERATION SWITCH
BLACKOUT MARKER LAMP
23B
LAMP SWITCH
23J
23P
23
23C
30
23F
18A
18E
K3
23P
A
24V TRAILER CONNECTOR
19
26
12 V FROM CB-1
24E
24F
24H
F
FOR BLACKOUT STOP LAMP
K4
23W
24D
24
25C
24
23G
24C
BLACKOUT MARKER LAMPS
23E
23D
24D
K5
14
BLACKOUT TAIL LAMP
BLACKOUT HEAD LAMP
TO RELAY #1
35
K6
TO RELAY #7
18
BLACKOUT STOP LAMP
19B
19A
12 V BATTERY
23F
25B
10
25A
25
24 V BATTERY
12
CB-7
18A
10B
CB-1
10C
18B
CB-8
STOP LAMP SWITCH
STATER RELAY
46B
STARTER SOLENOID
TA 074722

Figure 5-37. Blackout Lighting System Circuit

Table 5-13. Blackout Lighting System Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
			NOTE The following procedures assume that: a. Normal service lighting system functions properly (if not; refer to para 5-14). b. OPERATION switch is in BLACKOUT position.			
1		ALL BLACKOUT LAMPS INOPERATIVE.				
		Replace OPERATION switch.				
2		ONE BLACKOUT MARKER, HEADLAMP, TAIL LAMP OR STOP LAMP INOPERATIVE.				
	1	Replace bulb.	Lamp goes on.	Go to Step 2.		
	2	Check for voltage at lamp connector; then work back to OPERATION switch checking for voltage at each wire connector.	12V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).		
3		TRAILER BLACKOUT LAMPS INOPERATIVE.				
	1	Check for voltage at trailer applicable connector pin (A or F); then work back to output of relay (K4 or K5) checking for voltage at each wire connection.	24V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).	Go to Step 2.	
	2	Check for voltage at input of relay coil (K4 or K5).	12V nominal.	Go to Step 3.	Go to Step 4.	If power is available, problem is in relay or 24V circuit from starter solenoid. If power is not available, problem is in relay or 12V circuit from OPERATIONS switch. Check relay as described in para. 5-5C.

Table 5-13. Blackout Lighting System Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
3		TRAILER BLACKOUT LAMPS INOPERATIVE (Continued).				
	3	Check for voltage at relay contact terminal; then work back to starter solenoid.	24V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).		
	4	Check for voltage at each wire contact from relay to OPERATION switch.	12V nominal available at one test point; not available at preceding test point.	Inspect wiring between points checked; then replace defective wire(s).		

5-20. MISCELLANEOUS ELECTRICAL.

The items covered in this paragraph are:

a. Electric horn.

b. Heater fan.

c. Dome lamp in the cab.

d. Fixed work lamps (M916 and M920 only).

e. Portable work lamp receptacles.

f. Cigar lighter.

g. Winterization kit.

Table 5-14. Miscellaneous Electrical Circuit Troubleshooting.

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
1		ELECTRICAL HORN IS INOPERATIVE				
	1	Check horn for a good ground.	Clean and tighten.	Go to Step 2.	Repair.	
	2	Check for voltage at horn using multimeter while pressing horn button.	12 volts dc nominal.	Replace horn (para 5-68).	Go to Step 3.	
	3	Check for voltage at terminal 3 (fig. 5-38) on horn relay while pressing horn button.	12 volts dc nominal.	Check circuit 41 wiring.	Go to Step 4.	
	4	Check for voltage at terminal 1 on horn relay while pressing horn button.	12 volts dc nominal.	Go to Step 5.		
	5	Jumper terminal 2 on horn relay to ground.	Horn operates.	Go to Step 6.	Replace horn relay (para 5-67).	
	6	Check horn button switch ground and wiring to horn relay.	Wiring and ground okay.	Replace button switch (para 5-67).	Repair.	

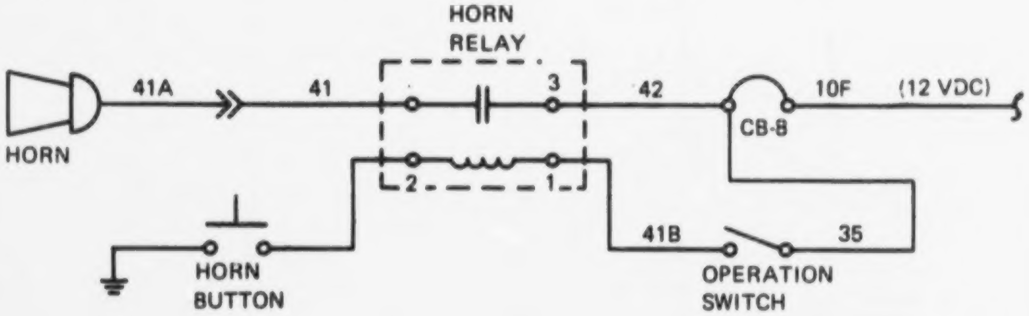


Figure 5-38. Electric Horn Circuit

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
2		PERSONNEL HEATER FAN INOPERATIVE.				
	1	Turn Engine Run switch ON and check for voltage at terminal B on heater switch, fig. 5-39 using a multimeter.	12 volts dc nominal.	Replace switch (para 5-69).	Go to Step 3.	
	2	If any speed is working check wiring between switch and fan motor.	Detective switch.	Repair.	Replace switch (para 5-69).	
	3	Troubleshoot wiring (circuits 33 and 34).				
3		DOME LAMP INOPERATIVE.				
	1	Replace the bulb.	Lamp lights.		Go to Step 2.	
	2	Using a multimeter check for voltage at dome lamp switch terminals (fig. 5-40).	12 volts dc nominal.	Replace switch (para 5-56).	Go to Step 3.	
	3	Troubleshoot wiring.				

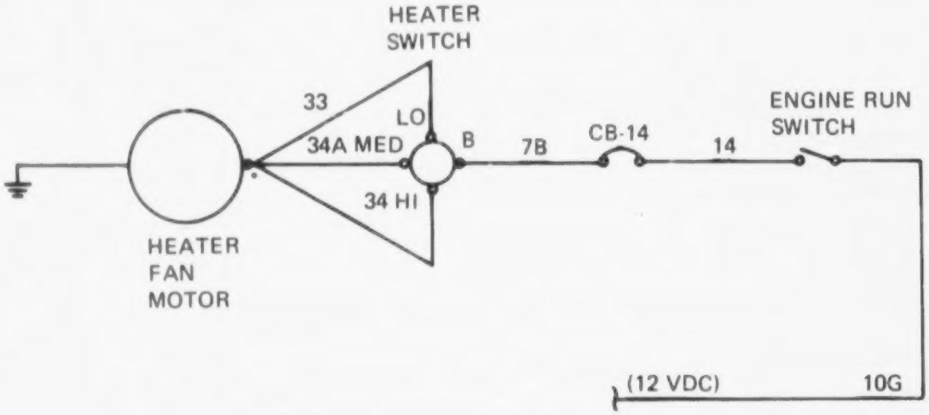
HEATER SWITCH
33
LO
34A MED
B
7B
CB-14
14
ENGINE RUN SWITCH
34 HI
HEATER FAN MOTOR
(12 VDC)
10G

Figure 5-39. Heater Fan Circuit

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

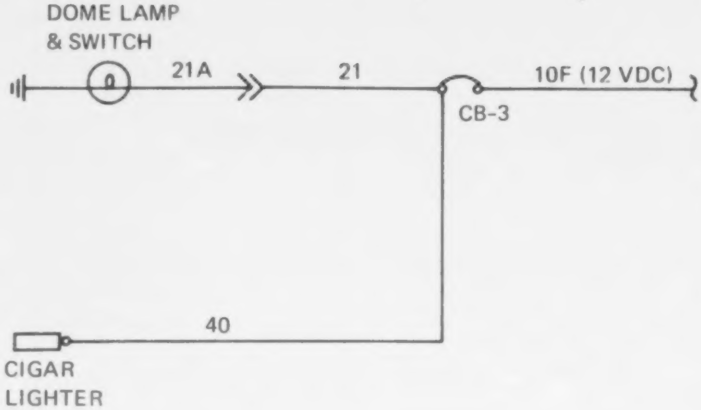
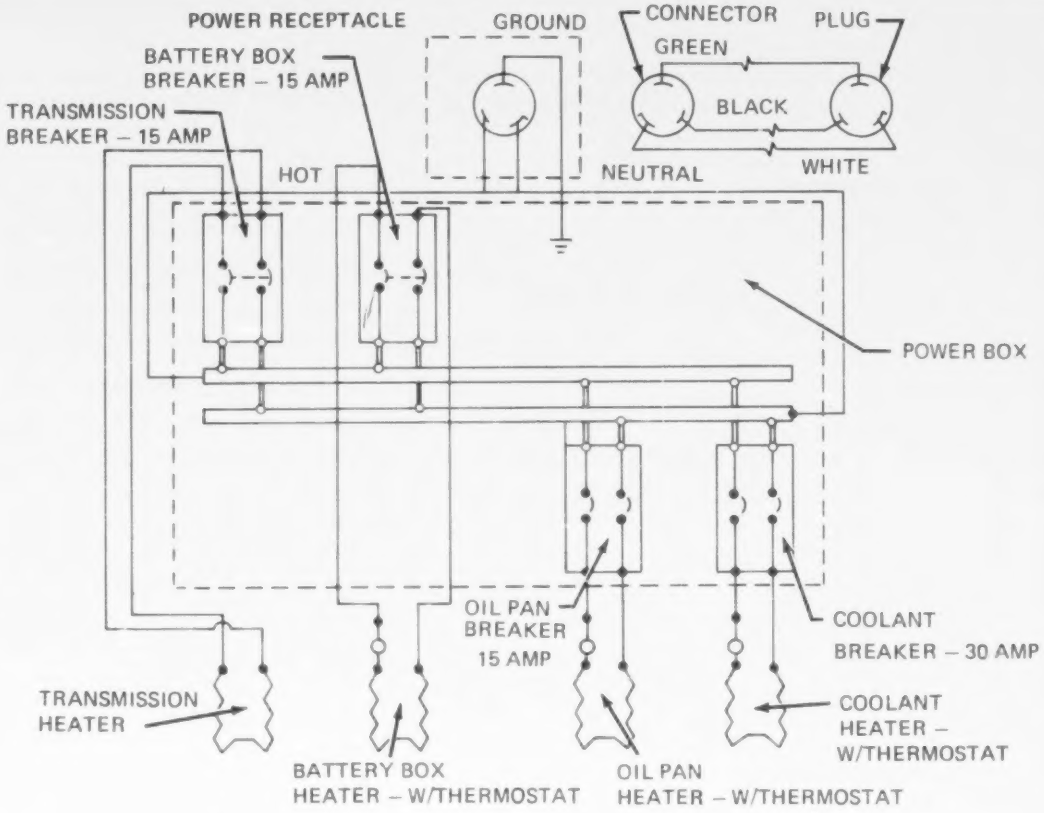
MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		 DOME LAMP & SWITCH 21A 21 10F (12 VDC) CB-3 40 CIGAR LIGHTER *Figure 5-40. Dome Lamp, Work Lamps, and Cigar Lighter Circuits.*				
4		WORK LAMPS INOPERATIVE (FIXED, M916 AND M920 ONLY).				
	1	Replace bulb.	Lamp lights.		Go to Step 2.	
	2	Check wiring between lamps and switch. Check for voltage at terminal on switch.	12 volts dc nominal.	Replace switch (para 5-62A).	Go to Step 3.	
	3	Troubleshoot wiring.				
5		WORK LAMPS INOPERATIVE (PORTABLE RECEPTACLES).				
	1	Replace bulb.	Lamp lights.		Go to Step 2.	
	2	Check wiring between lamps and switch. Check for voltage at terminal on switch.	12 volts dc nominal.	Replace switch (para 5-62A).	Go to Step 3.	
	3	Troubleshoot wiring.				
6		CIGAR LIGHTER INOPERATIVE.				
	1	Replace the lighter element.	Lighter works.		Go to Step 2.	
	2	Check for voltage at lighter receptacle, using a multimeter.	12 volts dc nominal.	Replace receptacle (para 5-60A).	Go to Step 3.	
	3	Troubleshoot wiring.				
						TA 074725

Table 5-14. Miscelleneous Electrical Circuit Troubleshooting (Continued).

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
		 *Figure 5-41. Winterization Kit*				
7		WINTERIZATION KIT MALFUNCTIONING.				
	1	Check 110 VAC power source.	Heaters functions.		Go to Step 2.	
	2	Check power cord, receptacle, and all wiring for breaks.	Heaters functions.		Go to Step 3.	
	3	Replace circuit breaker.	Heater functions.		Go to Step 4, 5, 6, or 7.	
	4	Replace engine oil heater thermostat.	Heater functions.		Refer to DS/GS for heater replacement.	

POWER RECEPTACLE
GROUND
CONNECTOR
PLUG
GREEN
BATTERY BOX BREAKER – 15 AMP
BLACK
TRANSMISSION BREAKER – 15 AMP
HOT
NEUTRAL
WHITE
POWER BOX
OIL PAN BREAKER 15 AMP
COOLANT BREAKER – 30 AMP
TRANSMISSION HEATER
COOLANT HEATER – W/THERMOSTAT
BATTERY BOX HEATER – W/THERMOSTAT
OIL PAN HEATER – W/THERMOSTAT

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Table 5-14. Miscellaneous Electrical Circuit Troubleshooting (Continued).

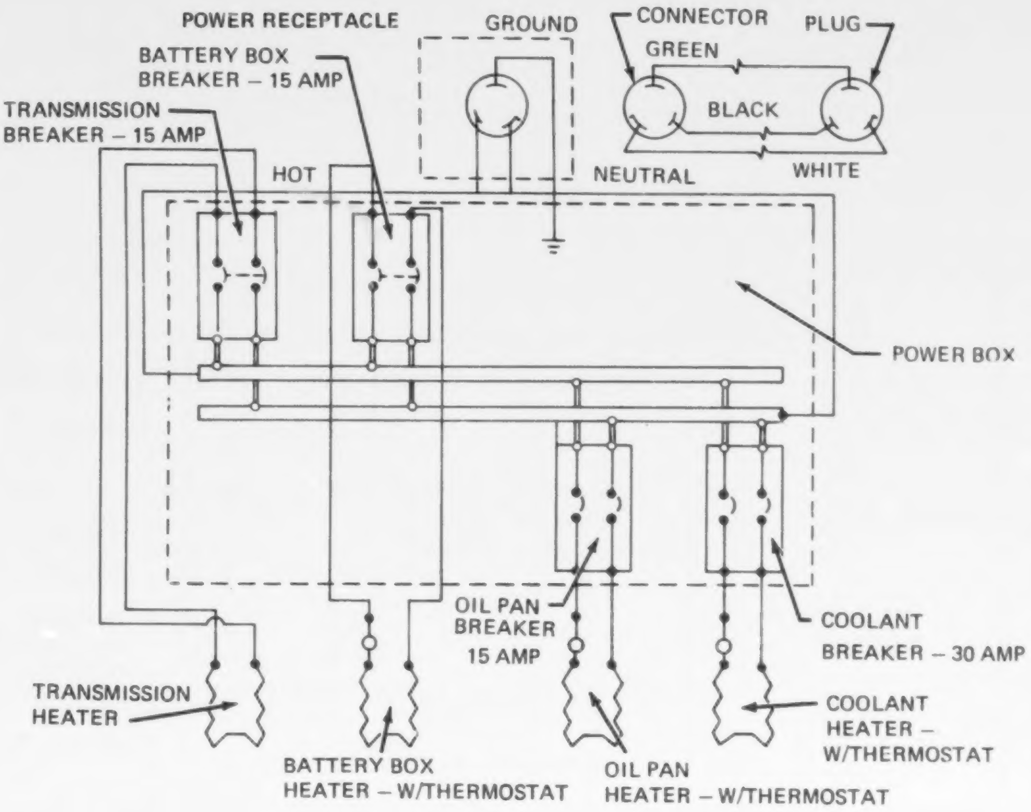
POWER RECEPTACLE
GROUND
CONNECTOR
PLUG
GREEN
BLACK
BATTERY BOX BREAKER – 15 AMP
TRANSMISSION BREAKER – 15 AMP
HOT
NEUTRAL
WHITE
POWER BOX
OIL PAN BREAKER 15 AMP
COOLANT BREAKER – 30 AMP
TRANSMISSION HEATER
COOLANT HEATER – W/THERMOSTAT
BATTERY BOX HEATER – W/THERMOSTAT
OIL PAN HEATER – W/THERMOSTAT

Figure 5-41. Winterization Kit

MALF	STEP	INSTRUCTION	INDICATION	YES	NO	REMARKS
7		WINTERIZATION KIT MALFUNCTIONING (Continued).				
	5	Replace engine coolant heater & thermostat.	Heater functions.			
	6	Replace transmission oil heater.	Heater functions.			
	7	Replace battery box heater and thermostat.	Heater functions.			

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Section III MAINTENANCE PROCEDURES

5-21. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the electrical and instrumentation systems. To find a specific maintenance procedure, see one of the following task summaries.

a. Circuit Breakers and Wiring (para 5-22).

b. Starting and Starting Control (para 5-23).

c. Batteries and Alternator (para 5-24).

d. Exterior Lighting (para 5-25).

e. Cab Interior Lighting and Switches (para 5-26).

f. Panel-Mounted Instruments (para 5-27).

g. Electric Horn and Cab Heater Control (para 5-28).

h. Sending Units, Switching Devices and Winterization Kit (para 5-29).

5-22. CIRCUIT BREAKERS AND WIRING MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All-Circuit Breakers.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Circuit Breaker Maintenance: (M915, M916 and M920):	5-30	None
	A. Removal.	5-30A	
	B. Installation.	5-30B	
	C. Operational Check	5-30C	
2	Circuit Breaker Maintenance (M917, M918 and M919):	5-30.1	None
	A. Removal.	5-30.1A	
	B. Installation.	5-30.1B	
	C. Operational Check.	5-30.1C	
3	Wiring Harness Maintenance:	5-31	None

5-23. STARTING AND STARTING CONTROL MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Small Flat Tip Punch.

MATERIALS/PARTS (P/N)

Gasket (5330-00-143-7737).
Nylon Rope (10 feet).
Gasket (5330-00-252-3274).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20 P.

REFERENCES (TROUBLESHOOTING)

Table 5-2, 4-1, 5-3.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Battery Disconnected.
11-14A or C.	Left Fender Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Starter Motor Maintenance:	5-32	4-1
	A. Removal.	5-32A	5-2
	B. Installation.	5-32B	
	C. Operational Check.	5-32C	
2	Starter Relay Maintenance:	5-33	5-2
	A. Removal.	5-33A	
	B. Installation.	5-33B	
	C. Operational Check.	5-33C	

5-23. STARTING AND STARTING CONTROL MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Starter Button Maintenance:	5-34	5-2
	A. Removal.	5-34A	
	B. Installation.	5-34B	
	C. Operational Check.	5-34C	
4	Engine Run Switch Maintenance:	5-35	4-1
	A. Removal.	5-35A	
	B. Installation.	5-35B	
	C. Operational Check.	5-35C	
5	Ether Button Maintenance:	5-36	5-3
	A. Removal.	5-36A	
	B. Installation.	5-36B	
	C. Operational Check.	5-36C	

5-24. BATTERIES AND ALTERNATOR MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

Battery Charger.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-1, 5-5.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-14 A&C.	Right Front Fender Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission in Neutral.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Disconnect Batteries:	5-37	5-1
	A. Removal.	5-37A	
	B. Installation.	5-37B	
	C. Operational Check.	5-37C	

5-24. BATTERIES AND ALTERNATOR MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2	Battery Maintenance:	5-38	5-1
	A. Removal.	5-38A	
	B. Cleaning.	5-38B	
	C. Inspection.	5-38C	
	D. Charging.	5-38D	
	E. Installation.	5-38E	
3	Battery Cables Maintenance:	5-39	5-1
	A. Removal.	5-39A	
	B. Installation.	5-39B	
	C. Operational Check.	5-39C	
4	Battery Box Latch Maintenance:	5-40	
	A. Removal.	5-40A	
	B. Installation.	5-40B	
	C. Operational Check.	5-40C	
5	Battery Box Cover Maintenance:	5-41	
	A. Removal.	5-41A	
	B. Installation.	5-41B	
	C. Checking Fit.	5-41C	
6	Battery Box Maintenance:	5-42	
	A. Removal.	5-42A	
	B. Installation.	5-42B	
7	Alternator Maintenance:	5-43	5-5
	A. Removal.	5-43A	
	B. Installation.	5-43B	
	C. Operational Check.	5-43C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

1. 35W-12V Bulb GE 4419 (or equal).
2. Non Flammable Cleaning Solvent. (Refer to Appendix C).
3. Bearing Grease (Refer to Appendix C).
4. Tape.
5. Marking Pen.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.
LO 9-2320-273-12.
TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-8, 5-9, 5-10, 5-11, 5-13, 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Battery Disconnected.
5-44A.	Headlamp Removed if Wire (3) is to be Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Park Brake Set.
Engine Off.
Transmisison in Neutral.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Headlamps Maintenance:	5-44	5-8
	A. Removal.	5-44A	
	B. Installation.	5-44B	
	C. Operational Check.	5-44C	
2	Front Turn and Marker Lamps Maintenance:	5-45	5-9 5-11
	A. Removal.	5-45A	
	B. Installation.	5-45B	
	C. Operational Check.	5-45C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Rear Lamp Assembly Maintenance:	5-46	5-10
	A. Removal.	5-46A	
	B. Installation.	5-46B	
	C. Operational Check.	5-46C	
4	Clearance Lamps Maintenance:	5-47	5-9
	A. Removal.	5-47A	
	B. Installation.	5-47B	
	C. Operational Check.	5-47C	
5	Blackout Headlamp Maintenance:	5-48	5-13
	A. Removal.	5-48A	
	B. Installation.	5-48B	
	C. Operational Check.	5-48C	
6	Blackout Marker Lamps Maintenance:	5-49	5-13
	A. Removal.	5-49A	
	B. Installation.	5-49B	
	C. Operational Check.	5-49C	
7	Blackout Tail and Stop Lamps Maintenance:	5-50	5-13
	A. Removal.	5-50A	
	B. Installation.	5-50B	
	C. Operational Check.	5-50C	
8	Stationary Worklamp Bulb Replacement:	5-51	5-14
	A. Removal.	5-51A	
	B. Installation.	5-51B	
	C. Operational Check.	5-51C	
9	Stationary Worklamp Replacement:	5-52	5-14
	A. Removal.	5-52A	
	B. Installation.	5-52B	
	C. Operational Check.	5-52C	

5-25. EXTERIOR LIGHTING MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10	Portable Work Lamp Bulb Replacement:	5-53	5-14
	A. Removal.	5-53A	
	B. Installation.	5-53B	
	C. Operational Check.	5-53C	
11	Portable Work Lamp Maintenance:	5-54	5-14
	A. Disassembly.	5-54A	
	B. Assembly.	5-54B	
	C. Operational Check.	5-54C	
12	Trailer Lamp Connector Maintenance (12 and 24 Volt):	5-55	5-10
	A. Removal (24 Volt Connector).	5-55A	
	B. Removal (12 Volt Connector).	5-55B	
	C. Inspection (24 Volt and 12 Volt).	5-55C	
	D. Installation (24 Volt Connector).	5-55D	
	E. Installation (12 Volt Connector).	5-55E	
	F. Test (24 Volt and 12 Volt).	5-55F	

5-26. CAB INTERIOR LIGHTING AND SWITCH MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-8, 5-11, 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Dome Lamp Maintenance:	5-56	5-14
	A. Removal.	5-56A	
	B. Installation.	5-56B	
	C. Operational Check.	5-56C	
2	Headlamp Dimmer Switch Maintenance:	5-57	5-8
	A. Removal.	5-57A	
	B. Installation.	5-57B	
	C. Operational Check.	5-57C	

5-26. CAB INTERIOR LIGHTING AND SWITCH MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Turn Signal Control Maintenance:	5-58	5-11
	A. Removal.	5-58A	
	B. Installation.	5-58B	
	C. Operational Check.	5-58C	

5-27. PANEL-MOUNTED INSTRUMENTS MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Seven Day Disk Pack (7530-01-060-1628).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10

REFERENCES (TROUBLESHOOTING)

Table 5-6, 5-7, 5-9, 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Battery Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Electrical Instruments Maintenance (LH Cluster):	5-59	5-7
	A. Removal.	5-59A	
	B. Installation.	5-59B	
	C. Operational Check.	5-59C	
2	Cigar Lighter Maintenance:	5-60	5-14
	A. Removal.	5-60A	
	B. Installation.	5-60B	
	C. Operational Check.	5-60C	

5-27. PANEL-MOUNTED INSTRUMENTS MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Low Air Pressure Indicator Lamp Maintenance:	5-61	5-6
	A. Removal.	5-61A	
	B. Installation.	5-61B	
	C. Operational Check.	5-61C	
4.	Electrical Switches Maintenance (RH Cluster):	5-62	5-6
	A. Removal.	5-62A	
	B. Installation.	5-62B	
	C. Operational check.	5-62C	
5.	Indicator Lamps Maintenance (RH Cluster):	5-63	5-7
	A. Removal.	5-63A	
	B. Installation.	5-63B	
	C. Operational Check.	5-63C	
6.	Clearance Lamps Switch Maintenance:	5-64	5-9
	A. Removal.	5-64A	
	B. Installation.	5-64B	
	C. Operational Check.	5-64C	
7.	Clearance Indicator Lamp Maintenance:	5-65	5-9
	A. Removal.	5-65A	
	B. Installation.	5-65B	
	C. Operational Check.	5-65C	
8.	Tachograph Maintenance:	5-66	5-7
	A. Reading Tachograph Disk.	5-66A	
	B. Disk Pack Removal.	5-66B	
	C. Disk Pack Installation.	5-66C	
	D. Tachograph Removal.	5-66D	
	E. Tachograph Installation.	5-66E	
	F. Operational Check.	5-66F	

5-28. ELECTRIC HORN AND CAB HEATER CONTROL MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

REFERENCES (TROUBLESHOOTING)

Table 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Horn Button Maintenance:	5-67	5-14
	A. Removal.	5-67A	
	B. Installation.	5-67B	
	C. Operational Check.	5-67C	
2	Horn Maintenance:	5-68	5-14
	A. Removal.	5-68A	
	B. Installation.	5-68B	
	C. Operational Check.	5-68C	

5-28. ELECTRIC HORN AND CAB HEATER CONTROL MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3	Heater Fan Switch Maintenance:	5-69	5-14
	A. Removal.	5-69A	
	B. Installation.	5-69B	
	C. Operational Check.	5-69C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Gasket, Fuel Level Sending Unit (2013).
Container (Approx. 2 gal).
30 Amp Circuit Breaker.
15 Amp Circuit Breaker (3).
Gasket (1020803).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 6-1, 5-6, 5-12, 5-7, 12-2, 5-3, 5-11, 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Radiator Drained Below Actuator Level.
5-37A.	Batteries Disconnected.
6-9A.	Transmission Oil Drained.
6-9C.	Cab Floor Inspection Plate Removed.
9-13A.	Air Reservoir Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmisison in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1	Oil Pressure Sending Unit Maintenance:	5-70	5-7
	A. Removal.	5-70A	
	B. Installation.	5-70B	
	C. Operational Check.	5-70C	
2	Oil Pressure Switch Maintenance:	5-71	5-6
	A. Removal.	5-71A	
	B. Installation	5-71B	
	C. Operational Check.	5-71C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Water Temperature Sending Unit Maintenance:	5-72	5-7
	A. Removal.	5-72A	
	B. Installation.	5-72B	
	C. Operational Check.	5-72C	
4.	Water Temperature Switch Maintenance:	5-73	5-7
	A. Removal.	5-73A	
	B. Installation.	5-73B	
	C. Operational Check.	5-73C	
5.	Ether Temperature Switch Maintenance:	5-74	5-3
	A. Removal.	5-74A	
	B. Installation.	5-74B	
	C. Operational Check.	5-74C	
6.	Neutral Safety Switch Maintenance:	5-75	6-1
	A. Removal.	5-75A	
	B. Installation.	5-75B	
	C. Operational Check.	5-75C	
7.	Transmission Oil Temperature Sending Unit Maintenance:	5-76	5-7
	A. Removal.	5-76A	
	B. Installation.	5-76B	
	C. Operational Check.	5-76C	
8.	Backup Switch and Clutch Disengagement Sensor Maintenance:	5-77	5-12
	A. Removal.	5-77A	
	B. Installation.	5-77B	
	C. Operational Check.	5-77C	
9.	Backup Alarm Maintenance:	5-78	5-6
	A. Removal.	5-78A	
	B. Installation.	5-78B	
	C. Operational Check.	5-78C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10	Fuel Level Sending Unit Maintenance:	5-79	5-7
	A. Removal.	5-79A	
	B. Installation.	5-79B	
	C. Operational Check.	5-79C	
11	Low Air Pressure Buzzer Maintenance:	5-80	5-6
	A. Removal.	5-80A	
	B. Installation.	5-80B	
	C. Operational Check.	5-80C	
12	Low Air Pressure Switch Maintenance:	5-81	5-6
	A. Removal.	5-81A	
	B. Installation.	5-81B	
	C. Operational Check.	5-81C	
13	Park Brake Switch Maintenance:	5-82	5-7
	A. Removal.	5-82A	
	B. Installation.	5-82B	
	C. Operational Check.	5-82C	
14	Differential Lock-Up Switch Maintenance:	5-83	5-7
	A. Removal.	5-83A	
	B. Installation.	5-83B	
	C. Operational Check.	5-83C	
15	Power Takeoff (PTO) Switch Maintenance:	5-84	12-2
	A. Removal.	5-84A	
	B. Installation.	5-84B	
	C. Operational Check.	5-84C	
16	Stop Lamp Switch Maintenance:	5-85	5-11
	A. Removal.	5-85A	
	B. Installation.	5-85B	
	C. Operational Check.	5-85C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
17	Instrument Relay Maintenance:	5-86	None
	A. Removal.	5-86A	
	B. Installation.	5-86B	
	C. Operational Check.	5-86C	
18	Winterization Kit Circuit Breakers, Box, and Receptacle Maintenance:	5-87	5-14
	A. Removal of Circuit Breakers.	5-87A	
	B. Installation of Circuit Breakers.	5-87B	
	C. Operational Check.	5-87C	
	D. Removal of Circuit Breaker Box and Receptacle.	5-87D	
	E. Installation of Circuit Breaker Box and Receptacle.	5-87E	
	F. Operational Check.	5-87F	
19	Winterization Kit Transmission Oil Heater Maintenance:	5-88	5-14
	A. Removal of Heater.	5-88A	
	B. Installation of Heater.	5-88B	
	C. Operational Check.	5-88C	
20	Winterization Kit Engine Oil Heater Thermostat Maintenance:	5-89	5-14
	A. Removal of Thermostat.	5-89A	
	B. Installation of Thermostat.	5-89B	
	C. Operational Check.	5-89C	
21	Winterization Kit Engine Coolant Heater Maintenance:	5-90	5-14
	A. Removal of Heater.	5-90A	
	B. Installation of Heater.	5-90B	
	C. Operational Check.	5-90C	
22	Winterization Kit Battery Box Heater Maintenance:	5-91	5-14
	A. Removal of Heater.	5-91A	
	B. Installation of Heater.	5-91B	
	C. Operational Check.	5-91C	

5-29. SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
23	Winterization Kit Battery Box Thermostat and Terminal Strip Maintenance:	5-92	5-14
	A. Removal.	5-92A	
	B. Installation.	5-92B	
	C. Operational Check.	5-92C	
24	Winterization Kit Battery Box Insulation Maintenance:	5-93	None
	A. Removal.	5-93A	
	B. Cleaning.	5-93B	
	C. Installation.	5-93C	

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CIRCUIT BREAKERS AND WIRING.

5-30. CIRCUIT BREAKER MAINTENANCE. (M915, M916, and M920)

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Installation.	(4)
c. Operational Check.	(2)
	10 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, and M920 – (9) Circuit Breakers

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission on Neutral.
Park Brake Set.
Always disconnect batteries to prevent electrical shorts when working in the circuit breaker area. An electrical short or arc can cause damage to wiring and other electrical components.

CIRCUIT BREAKERS AND WIRING.

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, and M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

A. REMOVAL.

CAUTION

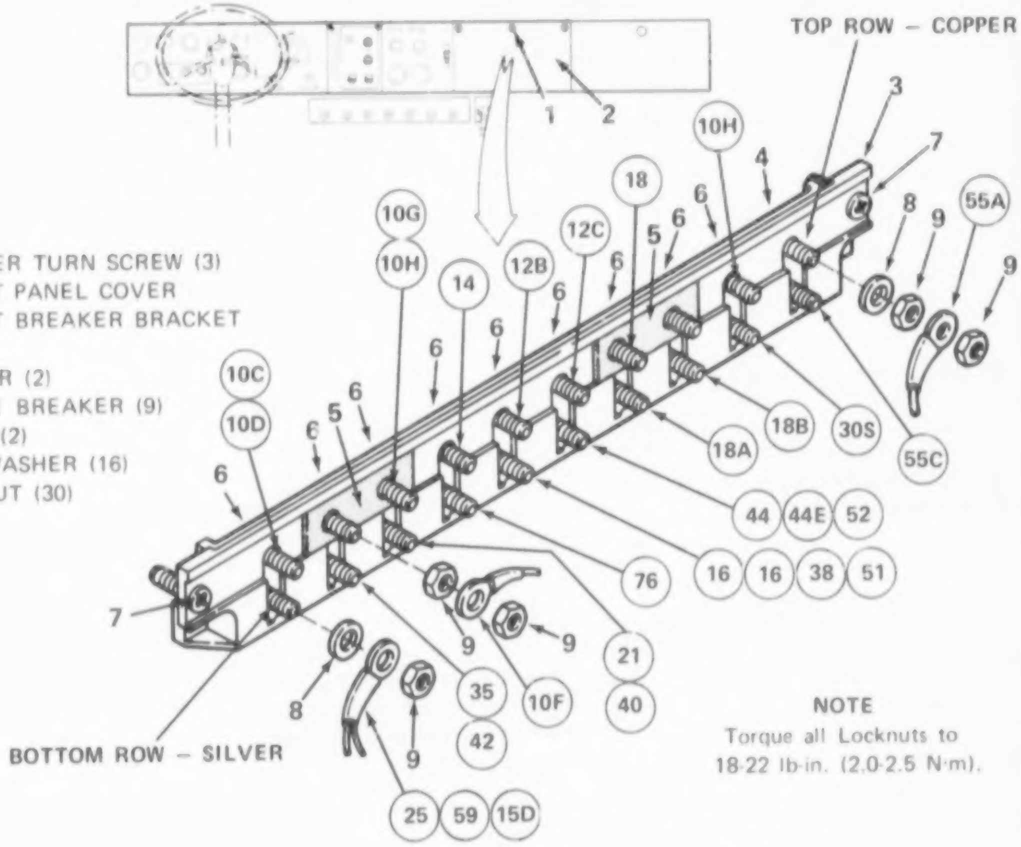
To prevent electrical shorts and damage to wiring or other components, always: use one flat washer and two locknuts on the top row of terminal studs (copper), except no flat washer is used where a bus bar is present. Use one flat washer and one locknut on the bottom row of terminal studs (silver).

Connect wire terminals to the correct circuit breaker or diode and to the correct color terminal stud as illustrated.

NOTE

Circled numbers in the illustration are wire numbers, while uncircled numbers are legend items.

Wire number 15D used on M916 and M920 only.


TOP ROW – COPPER
1
2
3
4
5
6
7
8
9
10H
10G
10C
10D
10F
12B
12C
14
15D
16
18
18A
18B
21
25
30S
35
38
40
42
44
44E
51
52
55A
55C
59
76
BOTTOM ROW – SILVER

LEGEND:
1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. CIRCUIT BREAKER BRACKET
4. DIODE
5. BUS BAR (2)
6. CIRCUIT BREAKER (9)
7. SCREW (2)
8. FLAT WASHER (16)
9. LOCKNUT (30)

NOTE
Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m).

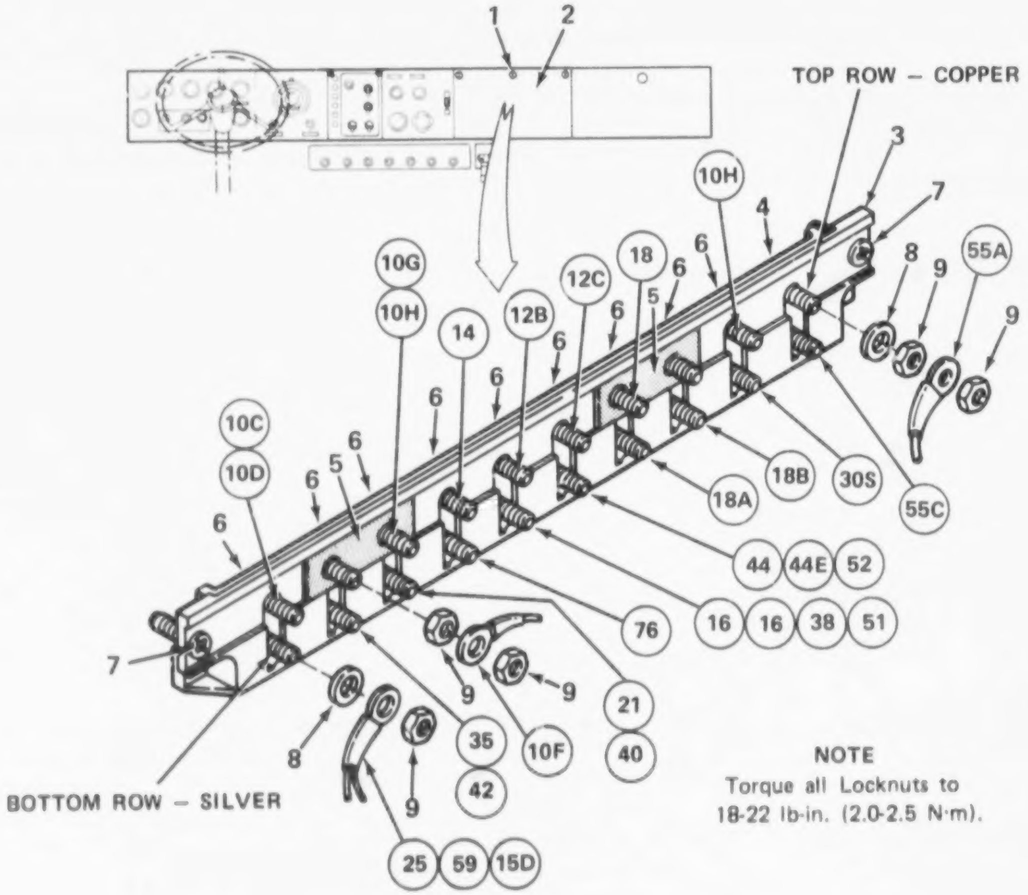
TA 074728

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, AND M920) (CONTINUED).

LOCATION/ITEM	ACTION	REMARKS
A REMOVAL (Continued).		
1. Three quarter turn screws (1).	Loosen.	
2. Circuit Panel cover (2).	Lower.	
3. Two screws (7).	Remove from circuit breaker bracket (3).	
4. Three locknuts (9) and two flat washers (8).	a. Unscrew from diode (4) or circuit breaker (6).	Only one flat washer (8) is used when a bus bar (5) is present.
	b. Remove wire terminals.	
	c. Remove diode (4) or circuit breaker (6).	Also remove bus bar (5) if used.
B. INSTALLATION.		
5. Diode (4) or circuit breaker (6).	a. Install in circuit breaker bracket (3).	Install per illustration, assuring the copper terminal stud is on top and the silver is on the bottom.
	b. Position bus bar (5) if used.	
	c. Install wire terminals.	Ensure wire terminals are connected to the correct circuit breaker or diode and to the correct color terminal stud.
	d. Secure with two flat washers (8) and three locknuts (9); torque each locknut to 18-22 lb-in. (2.0-2.5 N·m).	Only one flat washer (8) used when a bus bar (5) is present.
6. Circuit breaker bracket (3).	a. Aline mounting holes.	
	b. Secure with two screws (7).	
7. Circuit panel cover (2).	Raise into position.	
8. Three quarter turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Circuit breaker (6) or diode (4).	Refer to paragraph 2-34 and 2-35; check the operation of the circuit breaker or diode replaced.	

5-30. CIRCUIT BREAKER MAINTENANCE (M915, M916, and M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
TOP ROW – COPPER
3
7
10H
4
6
8
9
55A
9
10G
10H
12C
18
6
5
6
14
12B
6
6
6
6
10C
10D
6
5
6
6
18B
30S
55C
18A
44
44E
52
16
16
38
51
76
7
9
9
21
40
35
10F
8
42
9
BOTTOM ROW – SILVER
25
59
15D

NOTE
Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m).

LEGEND:
1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. CIRCUIT BREAKER BRACKET
4. DIODE
5. BUS BAR (2)
6. CIRCUIT BREAKER (9)
7. SCREW (2)
8. FLAT WASHER (16)
9. LOCKNUT (30)

TA 074729

CIRCUIT BREAKERS AND WIRING.

5-30.1 CIRCUIT BREAKER MAINTENANCE. (M917, M918, AND M919)

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Installation.	(4)
c. Operational Check.	(2)
	10 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M918, M919 – (7) Circuit Breakers.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission on Neutral.
Park Brake Set.
Always disconnect batteries to prevent electrical shorts when working in the circuit breaker area. An electrical short or arc can cause damage to wiring and other electrical components.

CIRCUIT BREAKERS AND WIRING.

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS

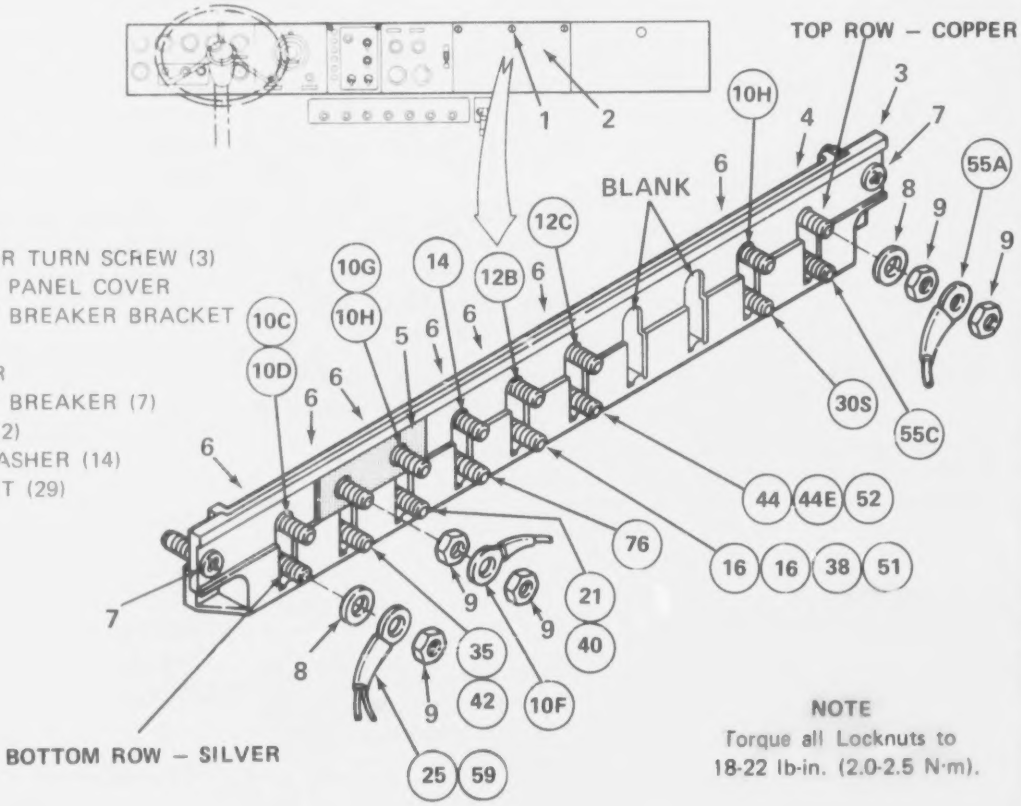
A. REMOVAL.

CAUTION

To prevent electrical shorts and damage to wiring or other components, always: use one flat washer and two locknuts on the top row of terminal studs (copper), except no flat washer is used where a bus bar is present. Use one flat washer and one locknut on the bottom row of terminal studs (silver).
Connect wire terminals to the correct circuit breaker or diode and to the correct color terminal stud as illustrated.

NOTE

Circled numbers in the illustration are wire numbers, while uncircled numbers are legend items.



TOP ROW – COPPER
BOTTOM ROW – SILVER
BLANK
1
2
3
4
5
6
7
8
9
10C
10D
10F
10G
10H
12B
12C
14
16
21
25
30S
35
38
40
42
44
44E
51
52
55A
55C
59
76

LEGEND:

1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. CIRCUIT BREAKER BRACKET
4. DIODE
5. BUS BAR
6. CIRCUIT BREAKER (7)
7. SCREW (2)
8. FLAT WASHER (14)
9. LOCKNUT (29)

NOTE

Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m).

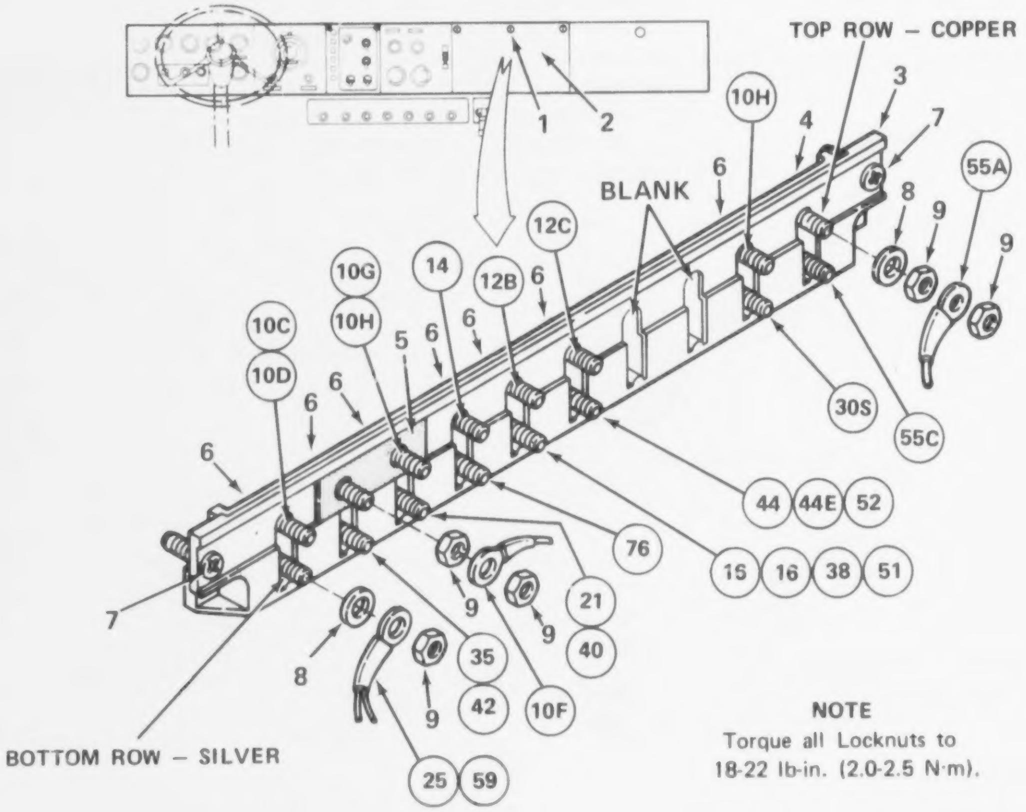
TA 076536

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (CONTINUED).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
1. Three quarter turn screws (1).	Loosen.	
2. Circuit Panel cover (2).	Lower.	
3. Two screws (7).	Remove from circuit breaker bracket (3).	
4. Three locknuts (9) and two flat washers (8).	a. Unscrew from diode (4) or circuit breaker (6).	Only one flat washer (8) is used when a bus bar (5) is present.
	b. Remove wire terminals.	
	c. Remove diode (4) or circuit breaker (6).	Also remove bus bar (5) if used.
B. INSTALLATION.		
5. Diode (4) or circuit breaker (6).	a. Install in circuit breaker bracket (3). b. Position bus bar (5) if used. c. Install wire terminals.	Install per illustration, assuring the copper terminal stud is on top and the silver is on the bottom. Ensure wire terminals are connected to the correct circuit breaker or diode and to the correct color terminal stud.
	d. Secure with two flat washers (8) and three locknuts (9); torque each locknut to 18-22 lb-in. (2.0-2.5 N·m).	Only one flat washer (8) used when a bus bar (5) is present.
6. Circuit breaker bracket (3).	a. Aline mounting holes. b. Secure with two screws (7).	
7. Circuit panel cover (2).	Raise into position.	
8. Three quarter turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Circuit breaker (6) or diode (4).	Refer to paragraph 2-34 and 2-35; check the operation of the circuit breaker or diode replaced.	

5-30.1 CIRCUIT BREAKER MAINTENANCE (M917, M918, AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
TOP ROW – COPPER
3
7
10H
4
55A
6
BLANK
8
9
9
12C
10G
14
12B
6
10C
10H
5
6
6
10D
6
6
30S
55C
6
44
44E
52
76
15
16
38
51
7
9
21
9
40
8
35
42
10F
9
25
59
BOTTOM ROW – SILVER

NOTE

Torque all Locknuts to 18-22 lb-in. (2.0-2.5 N·m).

LEGEND:
1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. CIRCUIT BREAKER BRACKET
4. DIODE
5. BUS BAR
6. CIRCUIT BREAKER (7)
7. SCREW (2)
8. FLAT WASHER (14)
9. LOCKNUT (29)

TA 076535

CIRCUIT BREAKERS AND WIRING.

5-31. WIRING HARNESS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

See Appendix D for Harness Routing and Location.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

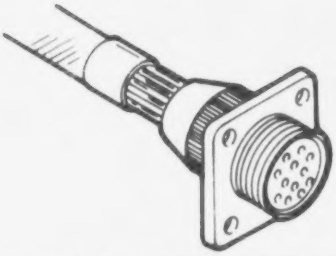
CIRCUIT BREAKERS AND WIRING.

5-31. WIRING HARNESS MAINTENANCE (Continued).

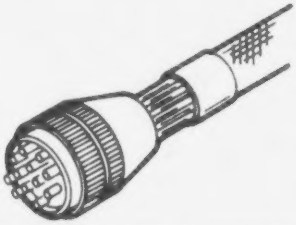
LOCATION/ITEM	ACTION	REMARKS

NOTE

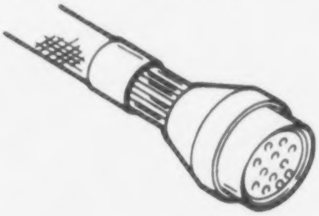
For removal and installation of vehicle wiring harness, refer to Appendix D for harness routing and location. Illustrated below are typical connectors and terminals used on the vehicle wiring harness. Use standard shop maintenance procedures in removing all harness clamps and cable ties.



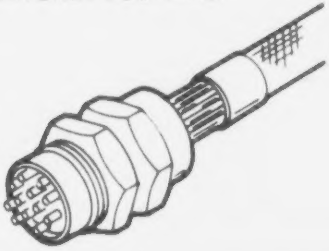
FEMALE TYPE RECEPTACLE
BAYONET COUPLING



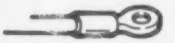
MALE TYPE CONNECTOR PLUG
BAYONET COUPLING



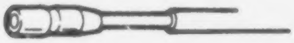
FEMALE TYPE RECEPTACLE
BAYONET COUPLING



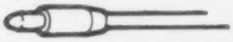
MALE TYPE CONNECTOR PLUG
BAYONET COUPLING



TERMINAL TYPE CONNECTOR



FEMALE CABLE CONNECTOR



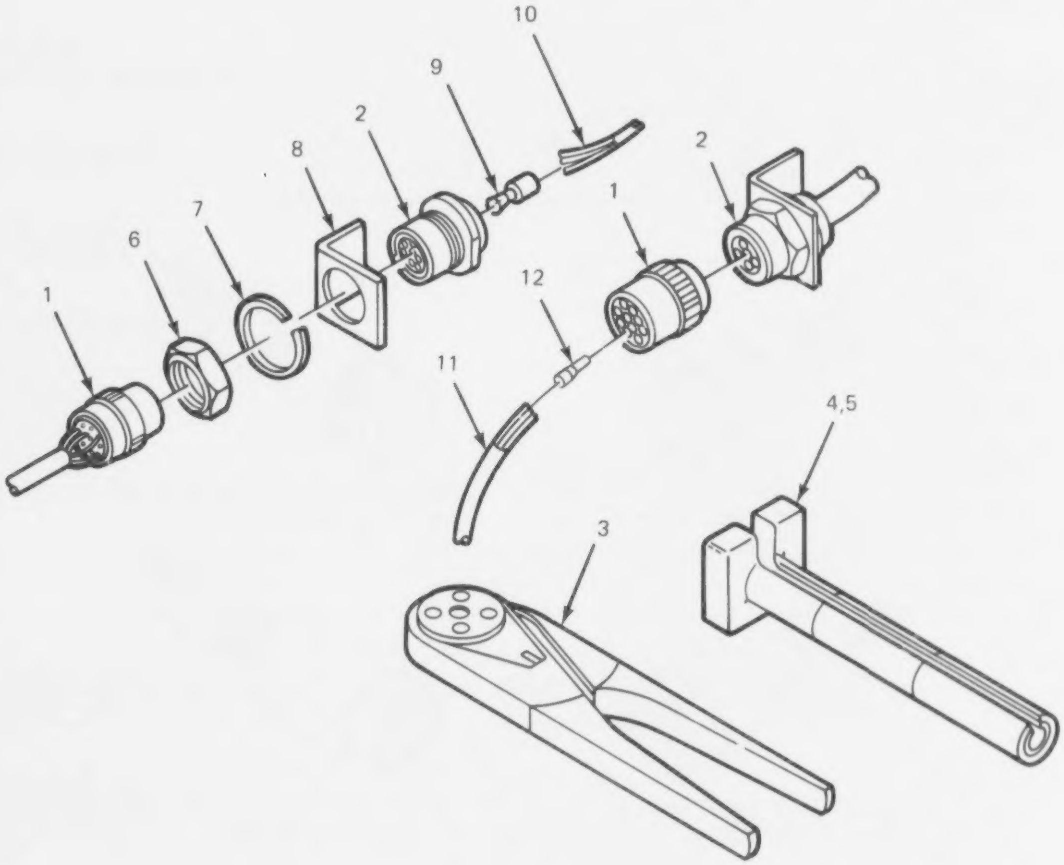
MALE CABLE CONNECTOR

TA 074730

ELECTRICAL SYSTEM.

5-31.1. WIRING HARNESS REPAIR.

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CONNECTOR PLUG
2. CONNECTOR RECEPTACLE
3. CRIMPING TOOL
4. CONTACT REMOVAL TOOL (SIZE #12)
5. CONTACT REMOVAL TOOL (SIZE #16)
6. HEXAGON NUT
7. LOCKWASHER
8. BRACKET
9. TERMINAL (AS REQUIRED)
10. WIRE (AS REQUIRED)
11. WIRE (AS REQUIRED)
12. TERMINAL PIN (AS REQUIRED)

TA 237221

5-31.1. WIRING HARNESS REPAIR (Continued).

A. CIRCULAR CONNECTOR PLUG REPAIR.

NOTE

Use this procedure to repair any one of the connector plugs.

LOCATION/ITEM	ACTION	REMARKS
1. Connector plug (1).	Unscrew and remove from connector receptacle (2).	
2. Terminal pin (12).	Using contact removal tool (4) or (5), pull out from rear side of connector plug (1).	If connector plug (1) is being replaced, repeat this step until all terminal pins (12) have been removed. Be sure to tag wires (11).
3. All parts.	Clean and inspect.	If any terminal pins (12) are damaged, perform steps (4) and (5).
4. Terminal pin (12).	Remove from wire (11) and discard.	
5. New terminal pin (12).	Using crimping tool (3), install onto wire (11).	Be careful not to damage terminal pin (12) during this step.
6. Terminal pin (12).	Push into rear end of connector plug (1) until it snaps into place.	If connector plug (1) is new, repeat this step until all terminal pins (12) have been installed. Check the mating side of connector plug (1) to make sure all connector receptacles (2) are on the same level.
7. Connector plug (1).	Line up slots with pins on connector receptacle (2) and screw in until it clicks into place.	

ELECTRICAL SYSTEM.

5-31.1. WIRING HARNESS REPAIR (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CIRCULAR CONNECTOR RECEPTACLE REPAIR.		
	NOTE Use this procedure to repair any one of the connector receptacles.	
1. Connector plug (1).	Unscrew and remove from connector receptacle (2).	
2. Hexagon nut (6) and lockwasher (7).	Unscrew and remove from connector receptacle (2).	
3. Connector receptacle (2).	Remove from bracket (8).	
4. Terminal (9).	Using contact removal tool (4) or (5), pull out from rear side of connector receptacle (2).	If connector receptacle (2) is being replaced, repeat this step until all terminals (9) have been removed. Be sure to tag wires (10).
5. All parts.	Clean and inspect.	If any terminals (9) are damaged, do steps 6 and 7.
6. Terminal (9).	Remove from wire (10) and discard.	
7. New terminal (9).	Using crimping tool (3), install onto wire (10).	Be careful not to damage terminal (9) during this step.
8. Terminal (9).	Push into rear end of connector receptacle (2) until it snaps into place.	If connector receptacle (2) is new, repeat this step until all terminals (9) have been installed. Check the mating side of connector receptacle (2) to make sure all terminals (9) are on the same level.
9. Connector receptacle (2).	a. Position on bracket (8). b. Secure with hexagon nut (6) and lockwasher (7).	
10. Connector plug (1).	Line up slots with pins on connector receptacle (2) and screw on until it clicks into place.	

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Installation.	(30)
c. Operational Check.	(2)
	62 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

1. Gasket (5330-00-143-7737).
2. Nylon Rope (10 Feet).
3. Gasket (5330-00-252-3274).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 4-1, 5-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
11-14 A & C.	Left Fender Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission In Neutral.

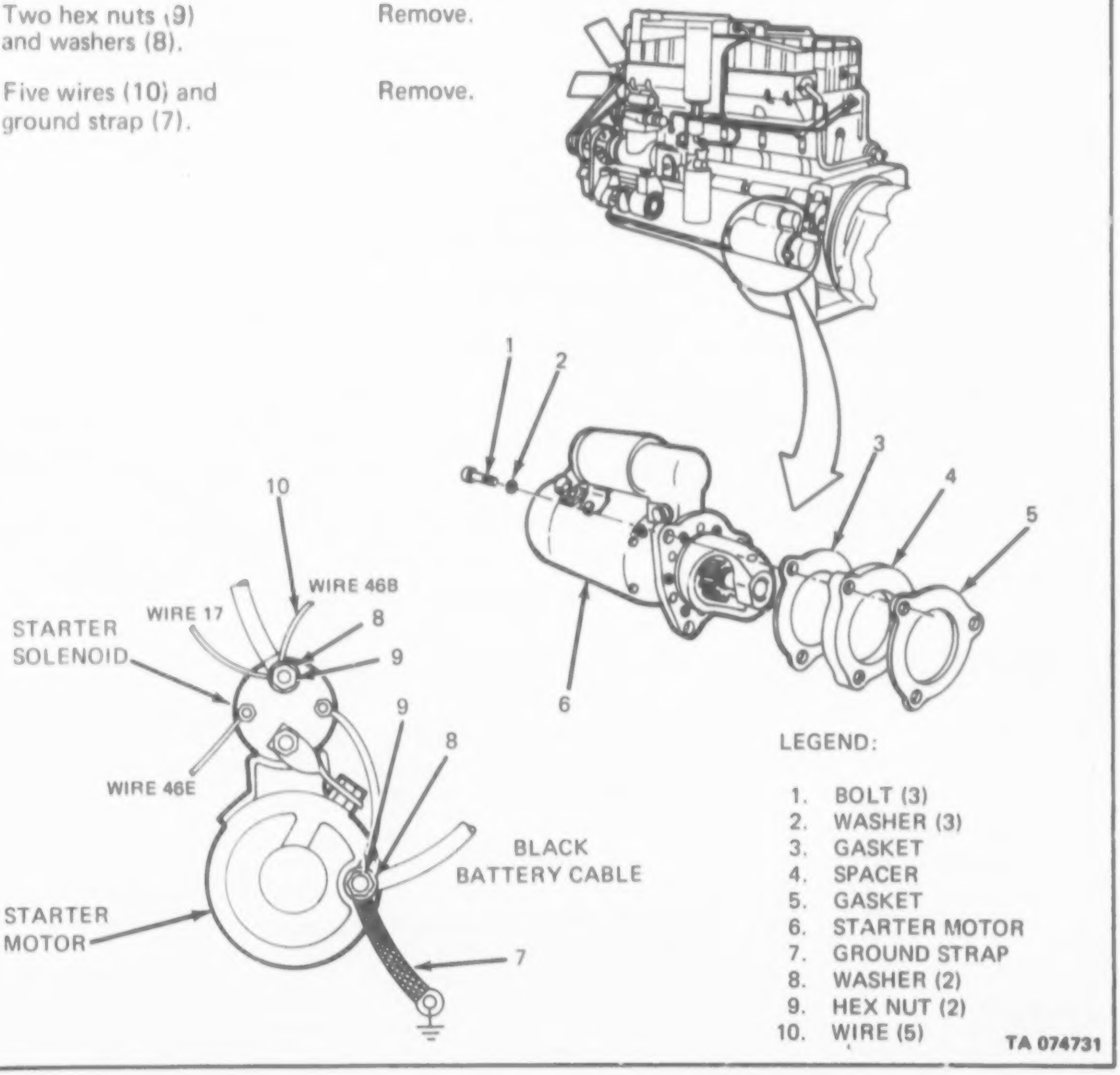
5-32. STARTER MOTOR MAINTENANCE (Continued).

WARNING

Disconnect battery cables before removing starter.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two hex nuts (9) and washers (8).	Remove.	
2. Five wires (10) and ground strap (7).	Remove.	


1
2
3
4
5
6
10
WIRE 46B
WIRE 17
8
9
STARTER SOLENOID
9
8
WIRE 46E
BLACK BATTERY CABLE
STARTER MOTOR
7

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET
4. SPACER
5. GASKET
6. STARTER MOTOR
7. GROUND STRAP
8. WASHER (2)
9. HEX NUT (2)
10. WIRE (5)

TA 074731

STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
	NOTE Wrap rope around starter motor and first mechanic holds rope while second mechanic performs steps 3, 4, 7, and 8.	
3. Three bolts (1) and washers (2).	Remove.	
4. Starter motor (6).	Remove.	
5. Gasket (3), spacer (4), and gasket (5).	Remove.	Discard gaskets (3) and (5).
B. INSTALLATION.		
6. New gasket (3), spacer (4), and new gasket (5).	Aline and install on starter motor (6).	
7. Starter motor (6).	Aline and install.	
8. Three washers (2) and bolts (1).	Install and tighten.	
9. Five wires (10) and ground strap (7).	Install on starter motor (6) according to figure.	
10. Two washers (8) and hex nuts (9).	Install and tighten.	
11. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10). Verify that starter motor (6) engages.	
	NOTE Follow-on maintenance action required: Install left fender, para 11-14B or D.	

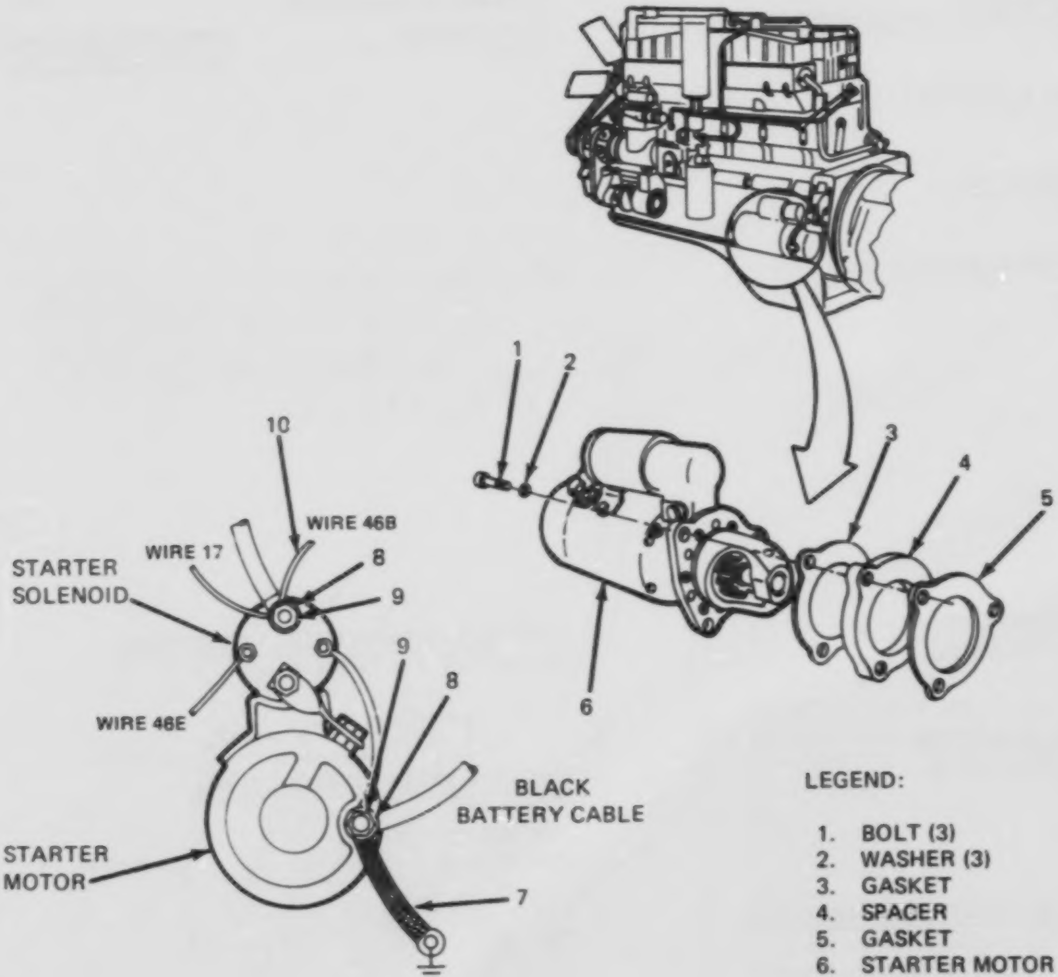
STARTING AND STARTING CONTROL.

5-32. STARTER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Follow-on maintenance action required:
Replace fender, para 11-14.


10
WIRE 46B
WIRE 17
STARTER SOLENOID
8
9
9
8
WIRE 46E
BLACK BATTERY CABLE
STARTER MOTOR
7
1
2
3
4
5
6

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET
4. SPACER
5. GASKET
6. STARTER MOTOR
7. GROUND STRAP
8. WASHER (2)
9. HEX NUT (2)
10. WIRE (5)

TA 074732

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5-33. STARTER RELAY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
Table 5-2.

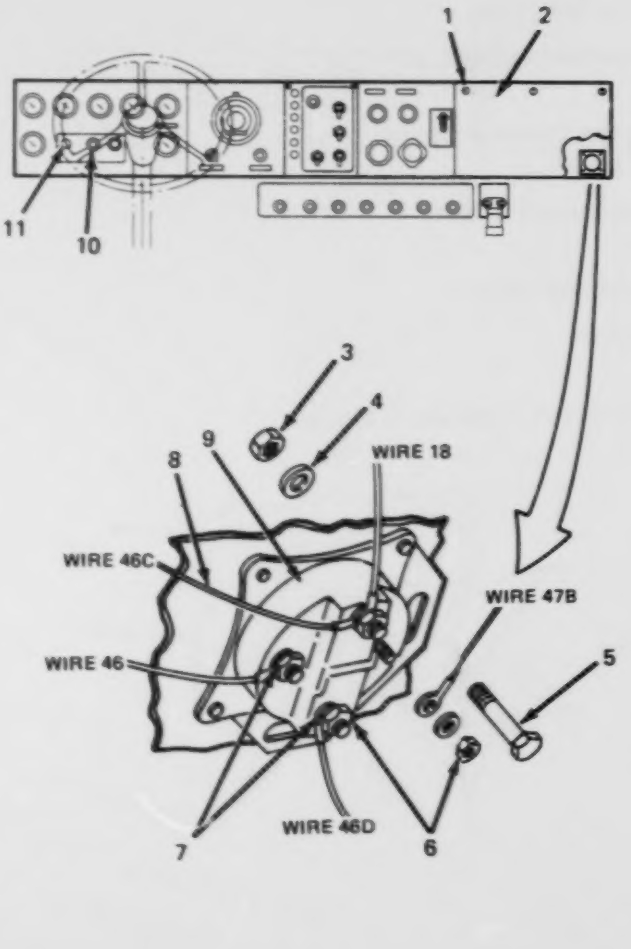
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

STARTING AND STARTING CONTROL.

5-33. STARTER RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower hinged panel.	
3. Four hex nuts (6) and washers (7).	Remove.	


1
2
11
10
3
4
9
8
WIRE 18
WIRE 46C
WIRE 47B
5
WIRE 46
7
WIRE 46D
6

LEGEND:

1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. HEX NUT (2)
4. WASHER (2)
5. BOLT (2)
6. HEX NUT (4)
7. WASHER (4)
8. WIRE (5)
9. STARTER RELAY
10. ENGINE START BUTTON
11. ENGINE RUN SWITCH

TA 074733

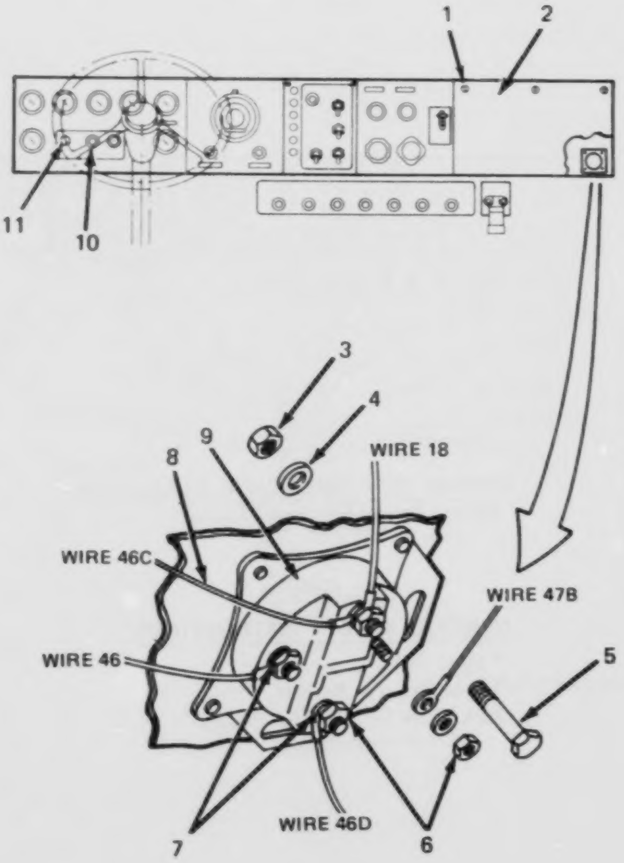
STARTING AND STARTING CONTROL.

5-33. STARTER RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Five wires (8).	Remove.	
5. Two bolts (5), washers (4), and hex nuts (3).	Remove.	
6. Starter relay (9).	Remove.	
B. INSTALLATION.		
7. Starter relay (9).	Set relay in place and aline mounting holes.	
8. Two bolts (5), washers (4), and hex nuts (3).	Install and tighten.	
9. Five wires (8).	Connect wires according to figure.	
10. Four washers (7) and hex nuts (6).	Replace and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	

5-33. STARTER RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
14. ENGINE RUN switch (11).	Turn ON.	
15. ENGINE START button (10).	Depress momentarily and observe that the starter motor engages.	


1
2
11
10
3
4
9
8
WIRE 18
WIRE 46C
WIRE 47B
WIRE 46
5
WIRE 46D
7
6

LEGEND:

1. QUARTER TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. HEX NUT (2)
4. WASHER (2)
5. BOLT (2)
6. HEX NUT (4)
7. WASHER (4)
8. WIRE (5)
9. STARTER RELAY
10. ENGINE START BUTTON
11. ENGINE RUN SWITCH

TA 074734

STARTING AND STARTING CONTROL.

5-34. ENGINE START BUTTON MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
Table 5-2.

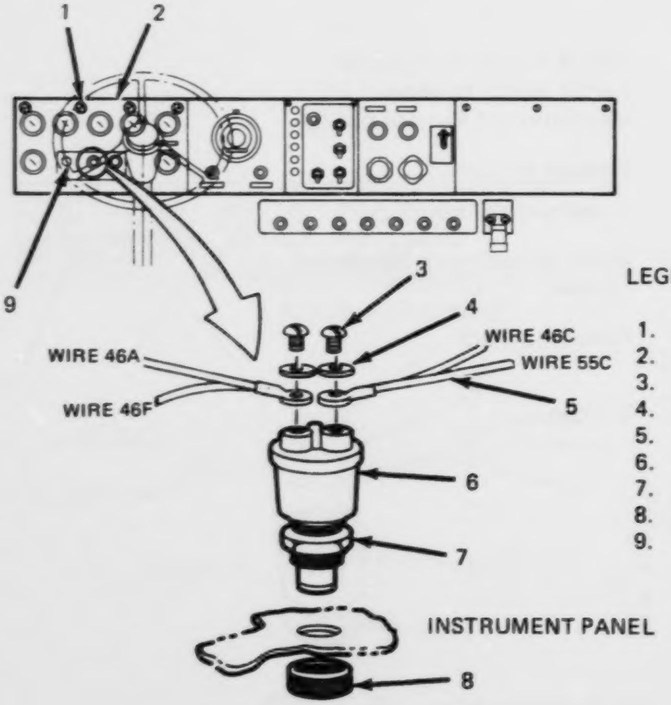
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-34. ENGINE START BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	


1
2
9
3
4
WIRE 46C
WIRE 46A
WIRE 55C
WIRE 46F
5
6
7
INSTRUMENT PANEL
8

LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. STARTER BUTTON
7. ADJUSTING HEX NUT
8. KNURLED NUT
9. ENGINE RUN SWITCH

TA 074735

STARTING AND STARTING CONTROL.

5-34. ENGINE START BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (3) and washers (4).	Remove.	
4. Four wires (5).	Remove.	
5. Knurled nut (8).	Remove.	
6. Starter button (6).	Remove.	
7. Adjusting hex nut (7).	Remove.	
B. INSTALLATION.		
8. Adjusting hex nut (7).	Adjust to proper depth on starter switch to allow installation of knurled nut (8).	
9. Starter button (6).	Replace in panel.	
10. Knurled nut (8).	Install and tighten.	
11. Four wires (5), two washers (4) and screws (3).	Install according to figure and tighten.	
12. Hinged instrument panel (2).	Raise into place.	
13. Four quarter-turn screws (1).	Tighten.	

5-34. ENGINE START BUTTON MAINTENANCE (Continued).

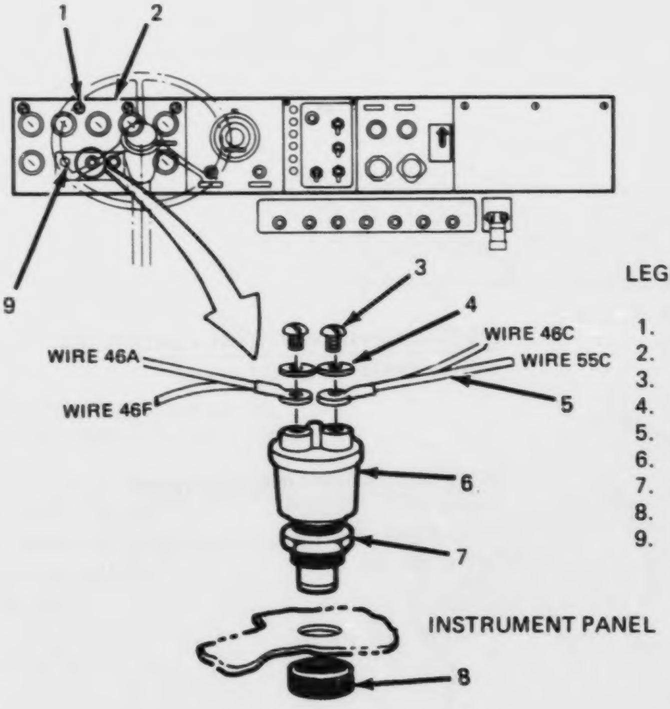
NOTE

Follow-on maintenance:

a. Hook up batteries; refer to para. 5-37B.

C. OPERATIONAL CHECK.

LOCATION/ITEM	ACTION	REMARKS
14. ENGINE RUN switch (9).	Turn ON.	
15. ENGINE START button (6).	Depress momentarily and observe that the starter motor engages.	


1
2
9
3
4
WIRE 46C
WIRE 55C
WIRE 46A
WIRE 46F
5
6
7
INSTRUMENT PANEL
8

LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. STARTER BUTTON
7. ADJUSTING HEX NUT
8. KNURLED NUT
9. ENGINE RUN SWITCH

TA 074736

STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE .

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Small Flat Tip Punch.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

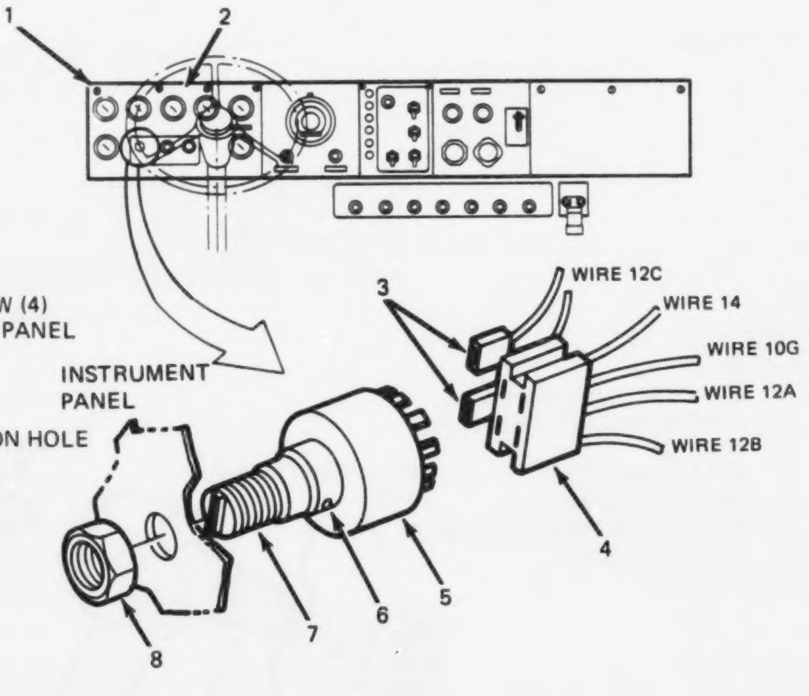
Engine OFF.
Transmission in Neutral.
Park Brake Set.

STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Wire connector (4) and two wires (3).	Remove.	
4. Hex nut (8).	Remove.	
5. ENGINE RUN switch (5).	Remove from instrument panel.	
6. Lock cylinder (7).	Place switch in ON position. Insert flat tip punch in cylinder extraction hole (6) and remove lock cylinder (7).	


1
2
3
WIRE 12C
WIRE 14
WIRE 10G
WIRE 12A
WIRE 12B
INSTRUMENT PANEL
4
5
6
7
8

LEGEND:

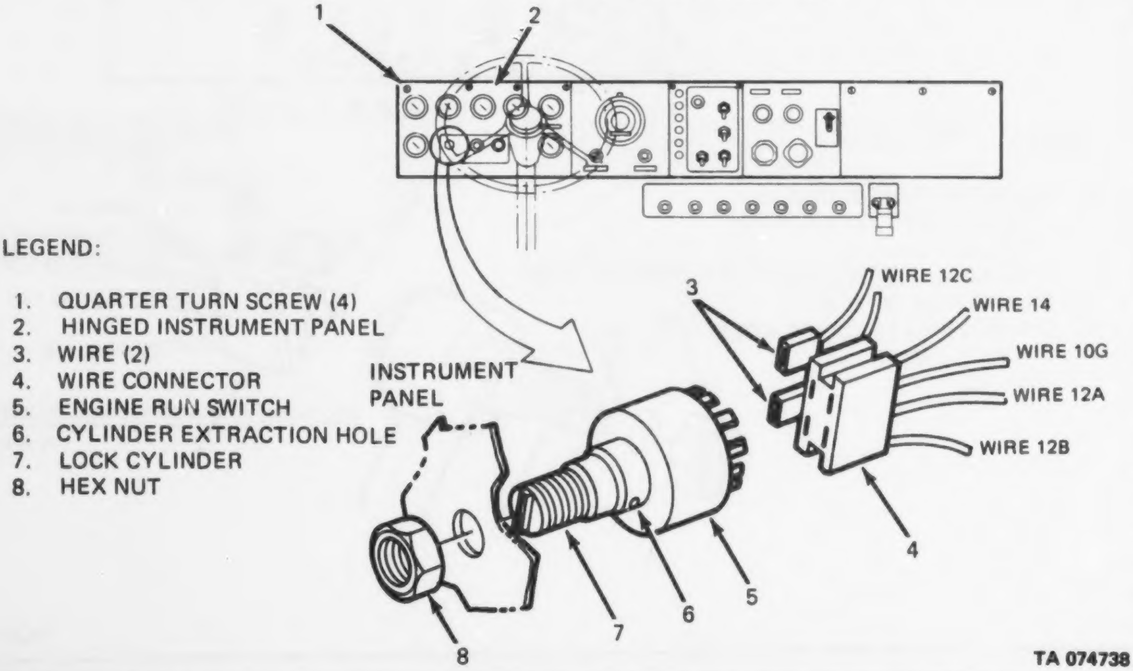
1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. WIRE CONNECTOR
5. ENGINE RUN SWITCH
6. CYLINDER EXTRACTION HOLE
7. LOCK CYLINDER
8. HEX NUT

TA 074737

STARTING AND STARTING CONTROL.

5-35. ENGINE RUN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. ENGINE RUN switch (5).	Aline lock cylinder (7) and press into switch.	
8. ENGINE RUN switch (5).	Aline and insert in instrument panel.	
9. Hex nut (8).	Install and tighten.	
10. Wire connector (4) and wires (3).	Install on switch.	
11. Hinged instrument panel (2).	Raise into place.	
12. Four quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 37B.	
C. OPERATIONAL CHECK.		
14. Engine	Start up (see TM 9-2320-273-10). Verify that all circuits are operational.	



LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. WIRE CONNECTOR
5. ENGINE RUN SWITCH
6. CYLINDER EXTRACTION HOLE
7. LOCK CYLINDER
8. HEX NUT

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STARTING AND STARTING CONTROL.

5-36. ETHER BUTTON MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOW [illegible] ASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(5)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
None.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
Table 5-3.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

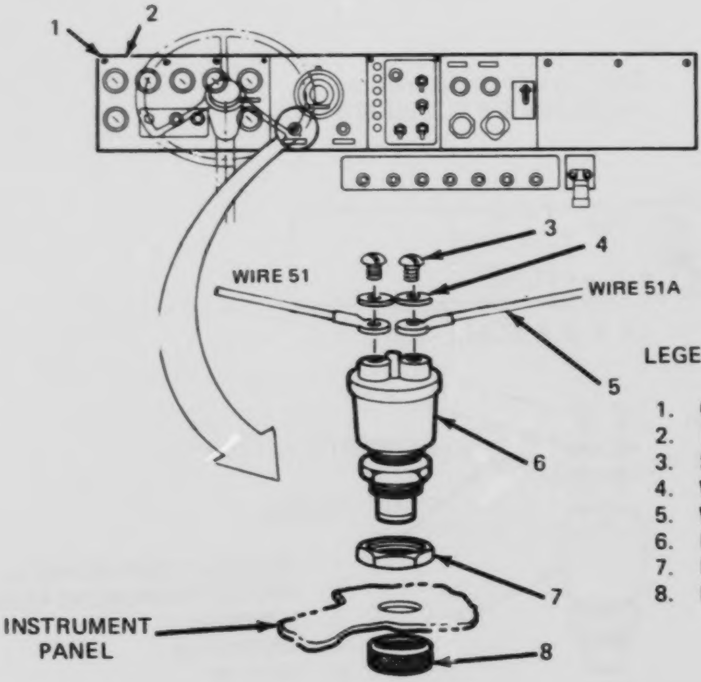
SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-36. ETHER BUTTON MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four quarter turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower hinged panel.	
3. Knurled nut (8).	Remove.	
4. ETHER button (6).	Remove.	
5. Hex nut (7).	Remove.	
6. Two screws (3) and washers (4).	Remove.	
7. Two wires (5).	Remove.	



LEGEND:

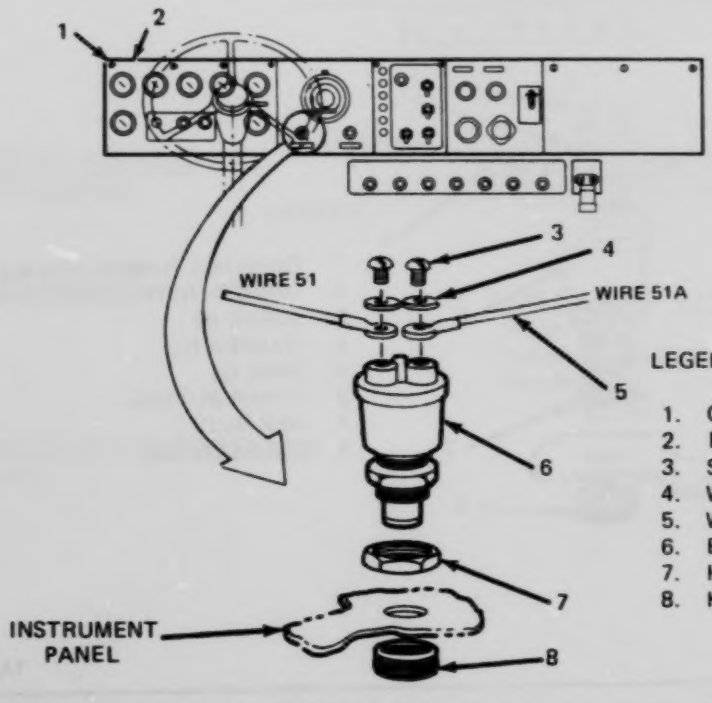
1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. SCREW (2)
4. WASHER (2)
5. WIRE (2)
6. ETHER BUTTON
7. HEX NUT
8. KNURLED NUT

TA 074739

STARTING AND STARTING CONTROL.

5-36. ETHER BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
8. Two wires (5).	Place on ETHER button (6).	
9. Two washers (4) and screws (3).	Install and tighten.	
10. Hex nut (7).	Install and adjust to proper depth on ETHER button (6) to allow installation of knurled nut (8).	
11. ETHER button (6).	Install in instrument panel.	
12. Knurled nut (8).	Install and tighten.	
13. Hinged instrument panel(2).	Raise into place.	
14. Four quarter turn screws (1).	Tighten.	
15. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
16. Engine.	Start up using cold start procedure (see TM 9-2320-273-10).	



LEGEND:

1. QUARTER TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. SCREW (2)
4. WASHER (2)
5. WIRE (2)
6. ETHER BUTTON
7. HEX NUT
8. KNURLED NUT

TA 074740

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BATTERIES AND ALTERNATOR MAINTENANCE.

5-37. DISCONNECT BATTERIES.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

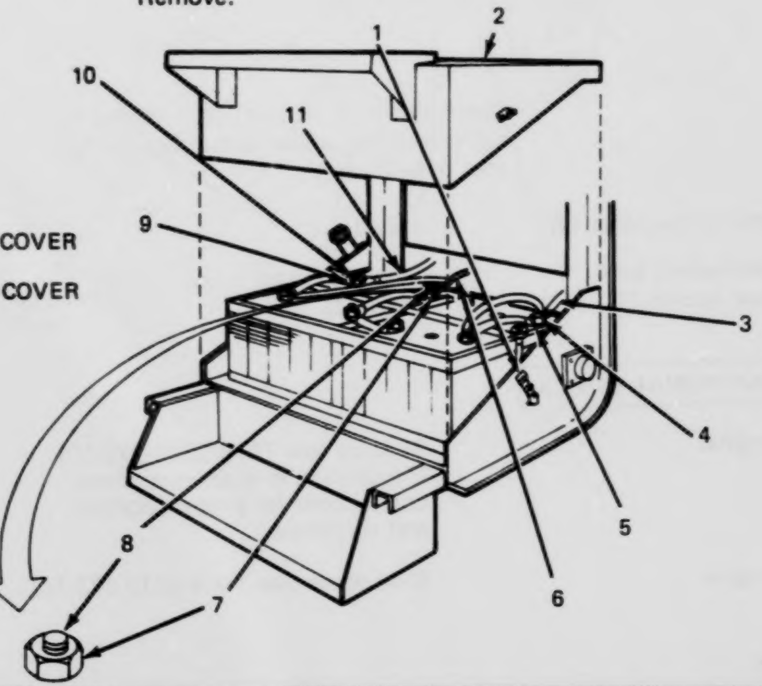
5-37. DISCONNECT BATTERIES (Continued).

CAUTION

Do not place edge of cover on cables.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two battery box cover latches (1).	Unfasten to slide off battery box cover (2).	
2. Hex nut (4).	Remove.	
3. Cable (3).	Remove from terminals (5). Replace hex nut (4) on terminal (5).	
4. Hex nut (7).	Remove.	
5. Cable (6).	Remove from terminal (8). Replace hex nut (7) on terminal (8).	
6. Hex nut (10).	Remove.	



LEGEND:

1. BATTERY BOX COVER LATCH (2)
2. BATTERY BOX COVER
3. CABLE
4. HEX NUT
5. TERMINAL
6. CABLE
7. HEX NUT
8. TERMINAL
9. TERMINAL
10. HEX NUT
11. CABLE

TA 074741

BATTERIES AND ALTERNATOR.

5-37. DISCONNECT BATTERIES (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Cable (11).	Remove from terminal (9). Replace hex nut (10) on terminal (9).	
B. INSTALLATION.		
8. Hex nut (10).	Remove from terminal (9).	
9. Cable (11).	Connect to terminal (9).	
10. Hex nut (10).	Install and tighten.	
11. Hex nut (7).	Remove from terminal (8).	
12. Cable (6).	Connect to terminal (8).	
13. Hex nut (7).	Install and tighten.	
14. Hex nut (4).	Remove from terminal (5).	
15. Cable (3).	Connect to terminal (5).	
16. Hex nut (4).	Install and tighten.	

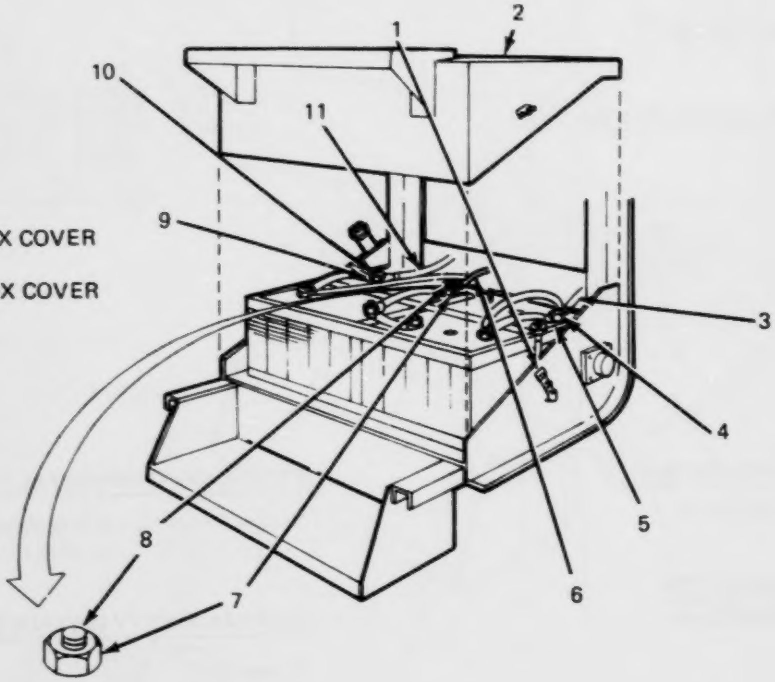
NOTE

Check cables at terminal connections for tightness; then, cover terminals with light coat of lubricant.

LOCATION/ITEM	ACTION	REMARKS
17. Battery box cover (2).	Install.	
18. Two battery box cover latches (1).	Fasten to battery box cover (2).	
C. OPERATIONAL CHECK.		
19. Engine.	Start up (see TM 9-2320-273-10). If system fails to operate, check connections for proper location and tighteness.	
20. Engine.	Shut down (see TM 9-2320-273-10).	

5-37. DISCONNECT BATTERIES (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BATTERY BOX COVER LATCH (2)
2. BATTERY BOX COVER
3. CABLE
4. HEX NUT
5. TERMINAL
6. CABLE
7. HEX NUT
8. TERMINAL
9. TERMINAL
10. HEX NUT
11. CABLE

TA 074742

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Cleaning.	(10)
c. Inspection.	(5)
d. Charging.	(120)
e. Installation.	(20)
	175 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

Battery Charger.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

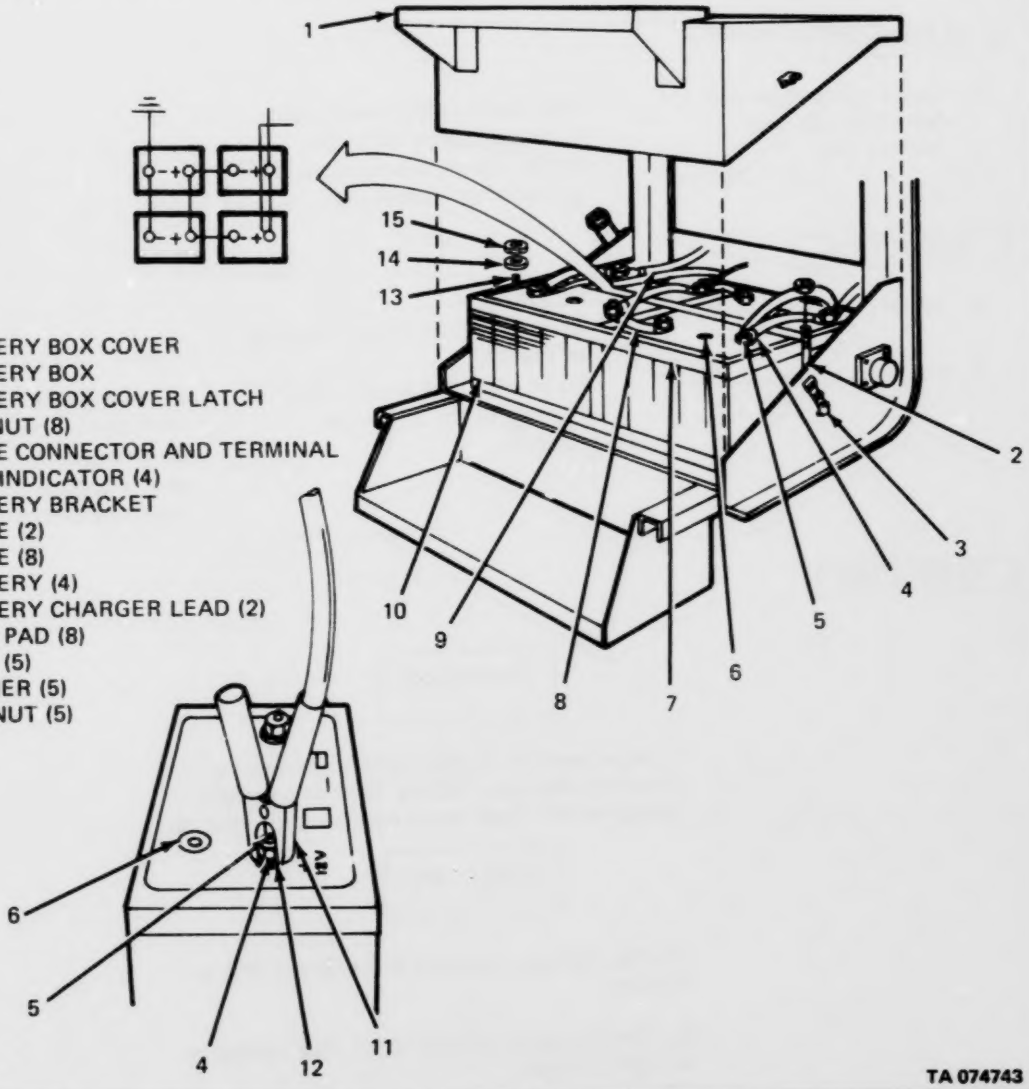
Engine OFF.
Transmission in Neutral.
Park Brake Set.

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two battery box cover latches (3).	Unfasten to remove battery box cover (1).	Pull up and out to remove.
2. Eight hex nuts (4).	Remove.	
3. Ten cables (8) and (9).	Remove.	



LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)

TA 074743

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Five bolts (13), washers (14), and hex nuts (15).	Remove.	
5. Battery bracket (7).	Remove.	
6. Four batteries (10).	Remove from battery box (2).	
B. CLEANING.		
7. Cable connectors and terminals (5), and battery top.	Use baking soda, water, and a wire brush to clean the parts. Cover connections with grease after installation.	
C. INSPECTION.		
8. Battery cases.	Make sure that none is leaking or cracked.	
9. Four test indicators (6).	Make sure that a GREEN DOT appears in the indicator window.	If indicator is completely dark the battery needs to be charged. If indicator shows yellow, the battery needs to be replaced.
D. CHARGING.		

WARNING

Always turn off charger before connecting or disconnecting to a battery to prevent sparks or arcing which might cause explosion or ignition.

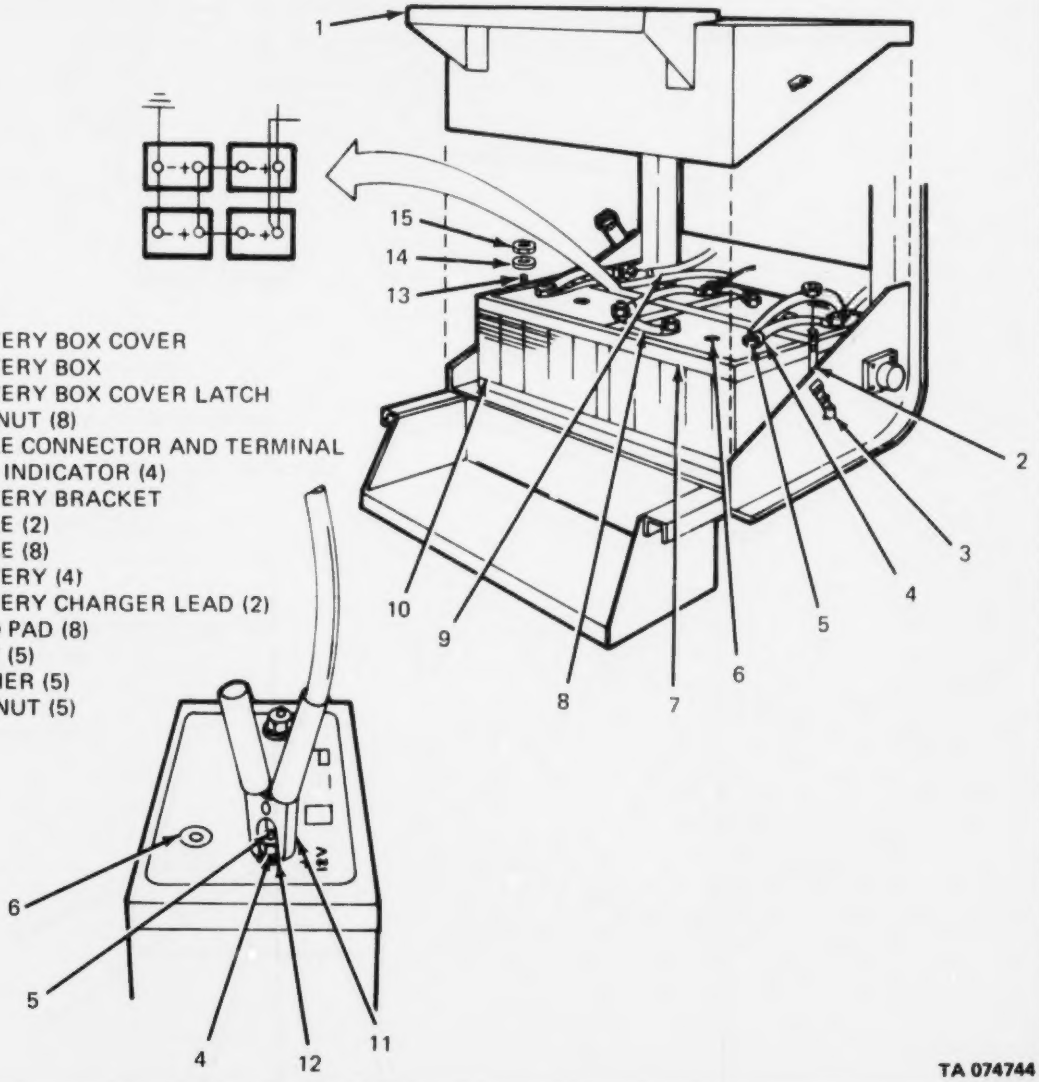
WARNING

Do Not Charge a Battery if the Green Dot is Visible.

Do Not Charge a Battery if the Test Indicator is Light Yellow.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHARGING (Continued).		
10. Eight hex nuts (4).	Install and tighten to positive and negative terminals.	
11. Two battery charger leads (11).	Connect to hex nuts (4) and lead pad (12) on positive and negative terminals. Charge battery according to table 5-15.	



LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)

TA 074744

Table 5-15. Battery Charging Rates.

BATTERY MODEL	SLOW CHARGING RATE	FAST CHARGING RATE
1200	5A at 15 hours 10A at 7-1/2 hours	20A at 3-3/4 hours 30A at 2-1/2 hours 40A at 2 hours 50A at 1-1/2 hours

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

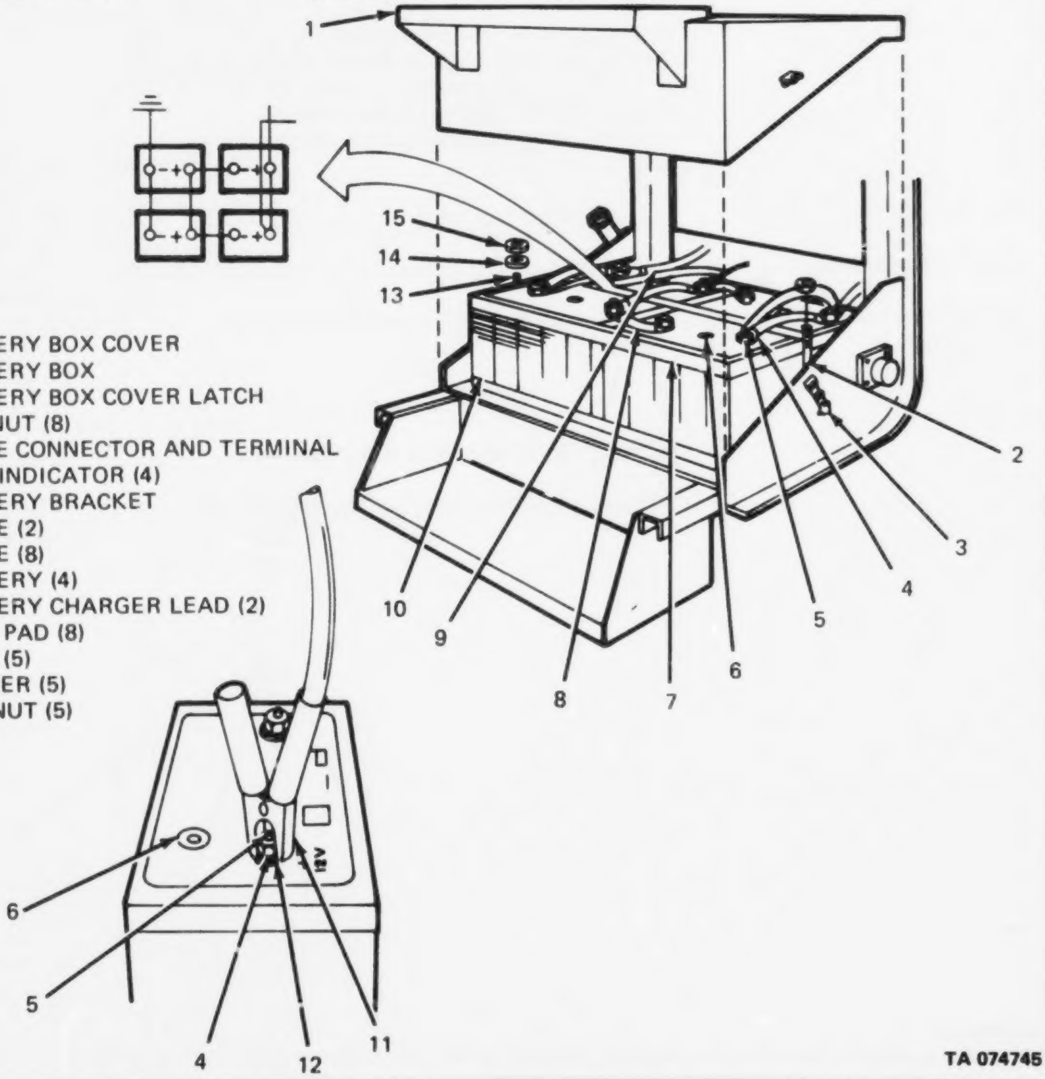
D. CHARGING (Continued).

WARNING

TO AVOID DAMAGE turn off charger and remove leads if:

a. Battery case feels hot (125°F) (51.7°C).
b. Violent gassing or spewing of electrolyte occurs.

LOCATION/ITEM	ACTION	REMARKS
12. Eight hex nuts (4).	Remove.	



LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)

TA 074745

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION.		
13. Four batteries (10).	Set batteries in box as shown.	
14. Battery bracket (7).	Set in place.	
15. Five bolts (13), washers (14), and hex nuts (15).	Install and tighten.	

CAUTION

Always check to make sure that the batteries are connected as shown in the illustration (series-parallel). Failure to connect batteries correctly can result in severe damage to the truck's electrical system.

LOCATION/ITEM	ACTION	REMARKS
16. Ten cables (8) and (9).	Connect to batteries as shown.	
17. Eight hex nuts (4).	Replace and tighten.	
18. Battery box cover latches (3).	Install cover (1) and fasten latches.	

NOTE

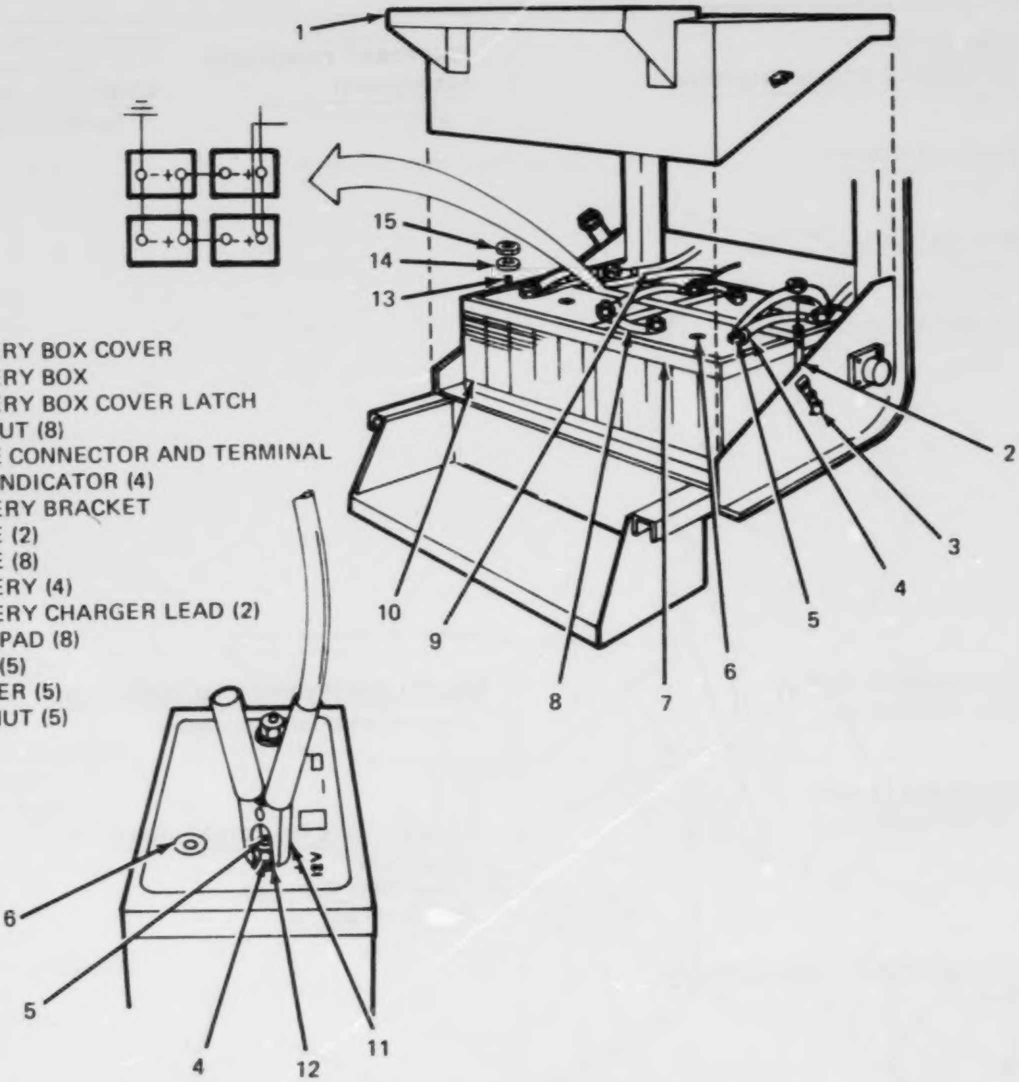
Follow-on maintenance action required:

a. Check operation; refer to TM 9-2320-273-10.

BATTERIES AND ALTERNATOR.

5-38. BATTERY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BATTERY BOX COVER
2. BATTERY BOX
3. BATTERY BOX COVER LATCH
4. HEX NUT (8)
5. CABLE CONNECTOR AND TERMINAL
6. TEST INDICATOR (4)
7. BATTERY BRACKET
8. CABLE (2)
9. CABLE (8)
10. BATTERY (4)
11. BATTERY CHARGER LEAD (2)
12. LEAD PAD (8)
13. BOLT (5)
14. WASHER (5)
15. HEX NUT (5)

TA 074746

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(6)
b.	Installation.	(6)
c.	Operational Check.	(2)
		14 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

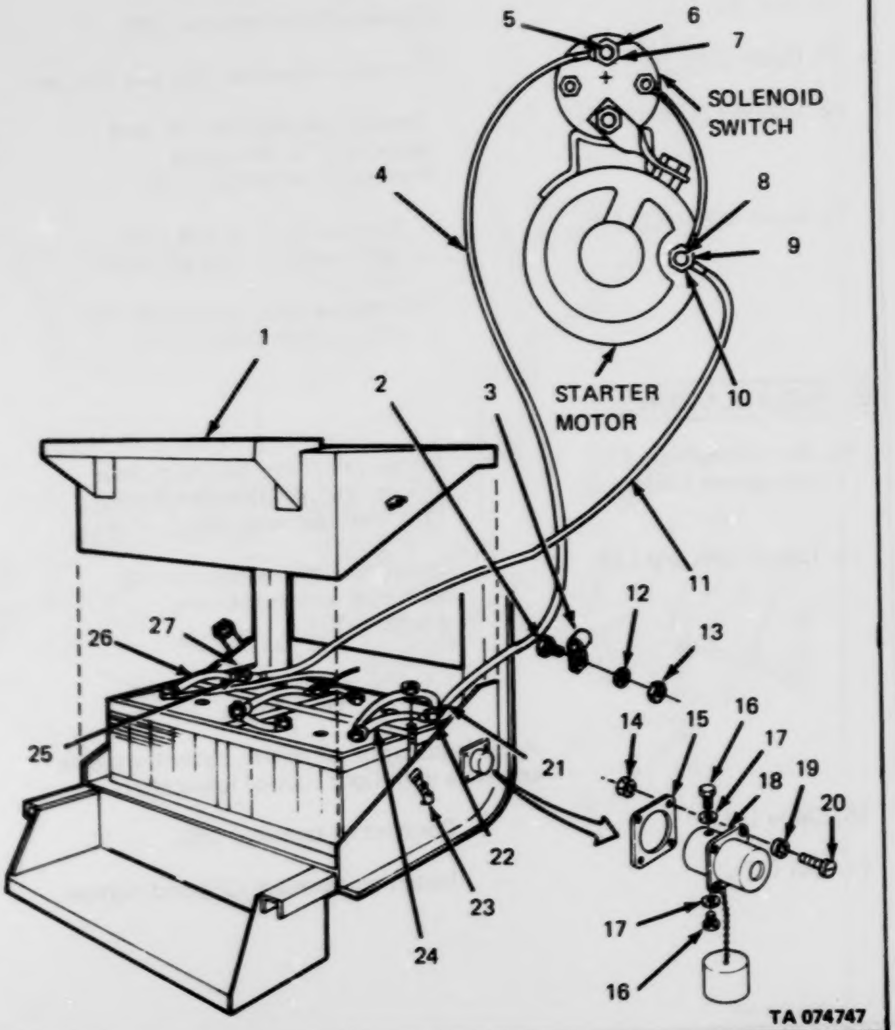
Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two battery box cover latches (23).	Unfasten to slide and remove battery box cover (1).	
2. Two bolts (2), washers (12), and nuts (13).	Remove.	
3. Two cable clamps (3).	Remove.	
4. Hex nut (22).	Remove from terminal (21).	

LEGEND:

1. COVER
2. BOLT (2)
3. CLAMP (2)
4. CABLE
5. TERMINAL
6. WASHER
7. NUT
8. TERMINAL
9. WASHER
10. NUT
11. CABLE
12. WASHER (2)
13. NUT (2)
14. NUT (4)
15. RUBBER GASKET
16. SCREW (2)
17. WASHER (2)
18. SLAVE RECEPTACLE
19. WASHER (8)
20. SCREW (4)
21. TERMINAL
22. HEX NUT
23. COVER LATCH (2)
24. CABLE
25. TERMINAL
26. CABLE
27. NUT


5
6
7
SOLENOID SWITCH
4
8
9
STARTER MOTOR
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18
19
20
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22
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24
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16
TA 074747

BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).

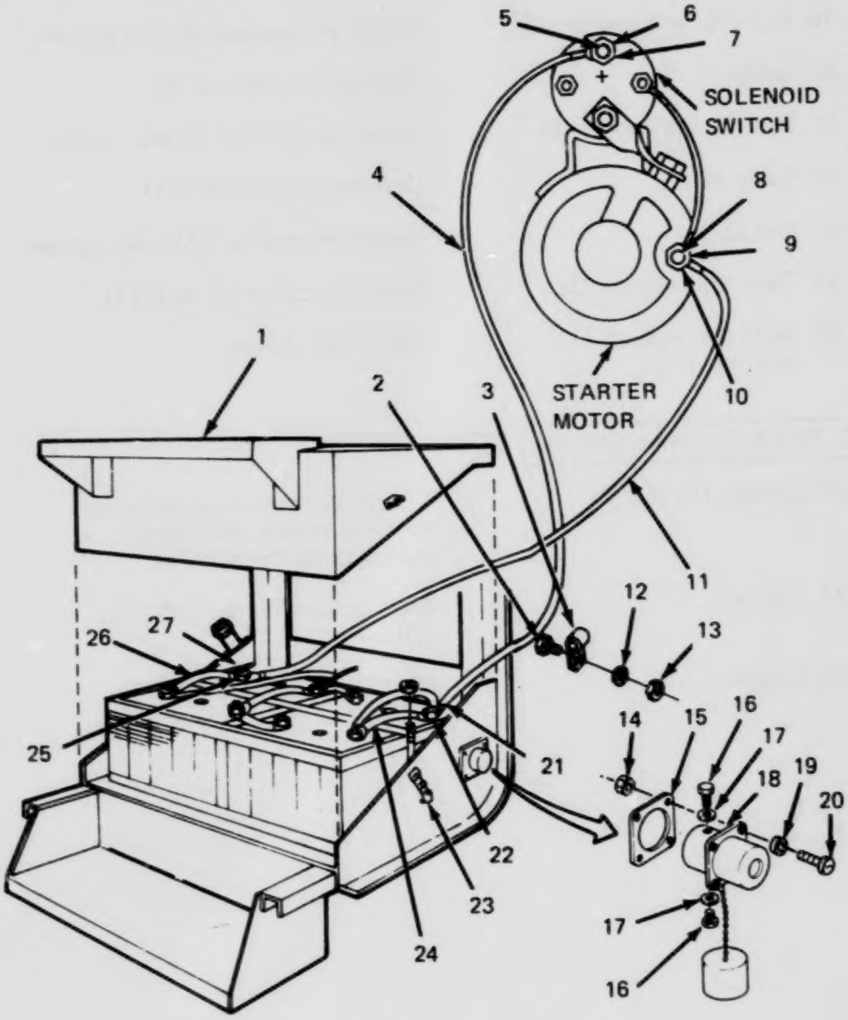
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Cable (4).	Remove from terminal (21).	
6. Nut (7) and washer (6).	Remove from terminal (5).	
7. Cable (4).	Lift from terminal (5) and remove.	
8. Nut (10) and washer (9).	Remove from terminal (8).	
9. Cable (11).	Remove from terminal (8).	
10. Nut (27).	Remove from terminal (25).	
11. Cable (11).	Lift from terminal (25) and remove.	
12. Cables (24) and (26).	Remove two screws (16) and washers (17); lift cables from slave receptacle (18).	Remove from battery terminals as shown, if required.
13. Slave receptacle (18).	a. Remove four screws (20), eight washers (19) and four nuts (14). b. Remove slave receptacle (18) with rubber gasket (15).	Replace if damaged.
B. INSTALLATION.		
14. Slave receptacle (18), and gasket (15).	Install to battery box with four screws (20), eight washers (19) and four nuts (14).	
15. Cables (24) and (26).	Install to slave receptacle (18) with two screws (16) and washers (17).	Reconnect to battery terminals as shown.
	NOTE After installation of cables, cover terminals and nuts with light coat of lubrication.	
16. Cable (11).	Connect to terminal (25).	
17. Nut (27).	Install on terminal (25) and tighten.	

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. COVER
2. BOLT (2)
3. CLAMP (2)
4. CABLE
5. TERMINAL
6. WASHER
7. NUT
8. TERMINAL
9. WASHER
10. NUT
11. CABLE
12. WASHER (2)
13. NUT (2)
14. NUT (4)
15. RUBBER GASKET
16. SCREW (2)
17. WASHER (2)
18. SLAVE RECEPTACLE
19. WASHER (8)
20. SCREW (4)
21. TERMINAL
22. HEX NUT
23. COVER LATCH (2)
24. CABLE
25. TERMINAL
26. CABLE
27. NUT


5
6
7
SOLENOID SWITCH
4
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STARTER MOTOR
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16

TA 074748

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
18. Cable (11).	Connect to terminal (8).	
19. Nut (10) and washer (9).	Install on terminal (8) and tighten.	
20. Cable (4).	Connect to terminal (5).	
21. Nut (7) and washer (6).	Install on terminal (5) and tighten.	
22. Cable (4).	Connect to terminal (21).	
23. Nut (22).	Install on terminal (21) and tighten.	
24. Two cable clamps (3).	Install on cables (4) and (11).	
25. Bolts (2), washers (12), and nuts (13).	Install and tighten.	
C. OPERATIONAL CHECK.		
26. Cables (11) and (4).	Check connections at batteries, solenoid switch, and starter motor to verify tightness.	
27. Engine.	Start up (see TM 9-2320-273-10).	
28. Engine.	Shut down (see TM 9-2320-273-10).	

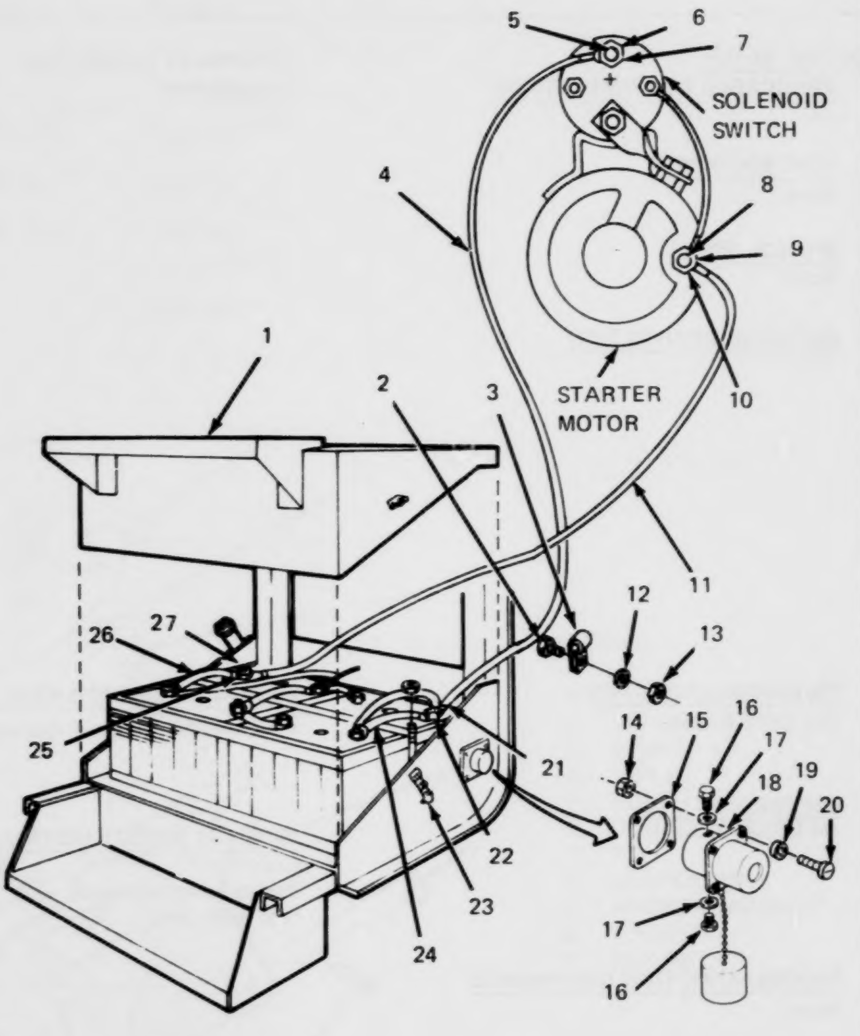
BATTERIES AND ALTERNATOR.

5-39. BATTERY CABLES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. COVER
2. BOLT (2)
3. CLAMP (2)
4. CABLE
5. TERMINAL
6. WASHER
7. NUT
8. TERMINAL
9. WASHER
10. NUT
11. CABLE
12. WASHER (2)
13. NUT (2)
14. NUT (4)
15. RUBBER GASKET
16. SCREW (2)
17. WASHER (2)
18. SLAVE RECEPTACLE
19. WASHER (8)
20. SCREW (4)
21. TERMINAL
22. HEX NUT
23. COVER LATCH (2)
24. CABLE
25. TERMINAL
26. CABLE
27. NUT


5
6
7
SOLENOID SWITCH
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STARTER MOTOR
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TA 075701

BATTERIES AND ALTERNATOR.

5-40. BATTERY BOX LATCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(6)
b.	Installation.	(6)
c.	Operational Check.	(1)
		13 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-41A.	Battery Box Cover Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

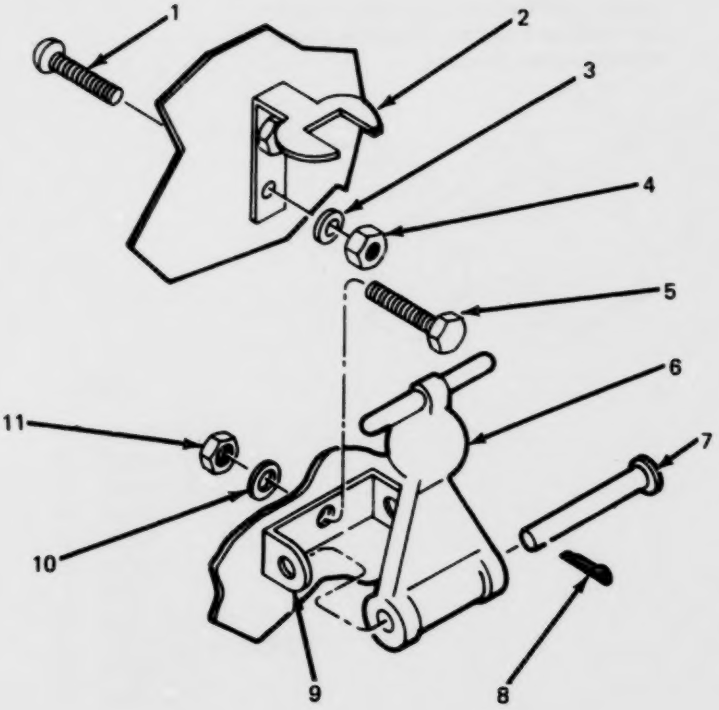
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (4), washers (3) and screws (1).	Remove.	
2. Bracket (2).	Remove.	
3. Cotter pin (8) and pin (7).	Remove.	
4. Battery box cover hook (6).	Remove.	
5. Hex nut (11), washer (10) and bolt (5).	Remove.	
6. Anchor bracket (9).	Remove.	



LEGEND:

1. SCREW (2)
2. BRACKET
3. WASHER (2)
4. NUT (2)
5. BOLT
6. HOOK
7. PIN
8. COTTER PIN
9. ANCHOR BRACKET
10. WASHER
11. HEX NUT

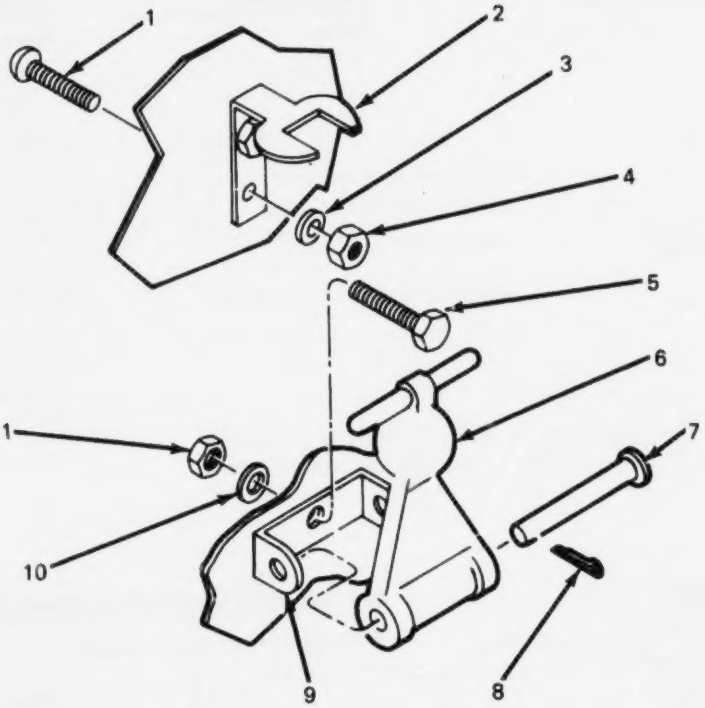
TA 074749

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Bracket (2), two screws (1), washers (3) and nuts (4).	Install and tighten.	
8. Anchor bracket (9), bolt (5), washer (10), and nut (11).	Install and tighten.	
9. Battery box cover hook (6), pin (7) and cotter pin (8).	Install	
C. OPERATIONAL CHECK.		
10. Battery box cover.	Install per paragraph 5-91B.	
11. Battery box hook .	Check that battery box cover hook (6) engages bracket (2) and is under tension when released.	

5-40. BATTERY BOX LATCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SCREW (2)
2. BRACKET
3. WASHER (2)
4. NUT (2)
5. BOLT
6. HOOK
7. PIN
8. COTTER PIN
9. ANCHOR BRACKET
10. WASHER
11. HEX NUT

TA 074750

BATTERIES AND ALTERNATOR.

5-41. BATTERY BOX COVER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2.0)
b. Installation.	(2.0)
c. Checking Fit.	(0.5)
	4.5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

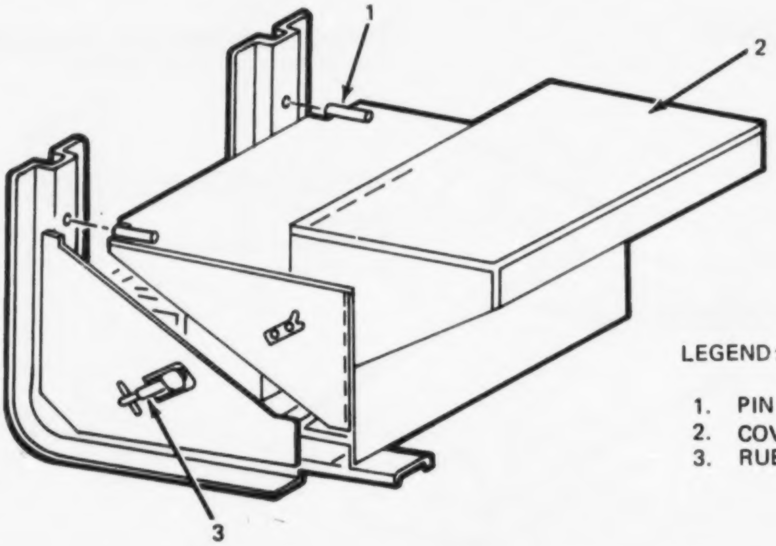
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral
Park Brake Set.

5-41. BATTERY BOX COVER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two rubber hooks (3).	Unlatch.	
2. Battery box cover (2).	Remove. a. Pull forward. b. Lift up.	
B. INSTALLATION.		
3. Battery box cover (2).	Install. a. Position to aline pins (1) with mounting holes. b. Slide back, then lower.	
4. Two rubber hooks (3).	Fasten to battery box cover.	
C. CHECKING FIT.		
5. Battery box.	Check fit of cover (1) over battery box; make sure hooks (3) latch tight on the bracket.	



LEGEND:

1. PIN (2)
2. COVER
3. RUBBER HOOK (2)

TA 074751

BATTERIES AND ALTERNATOR.

5-42. BATTERY BOX MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(10)
b.	Installation.	(10)
		20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-38A.	Batteries Removed.
9-16A.	Air Reservoir Above Battery Box Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

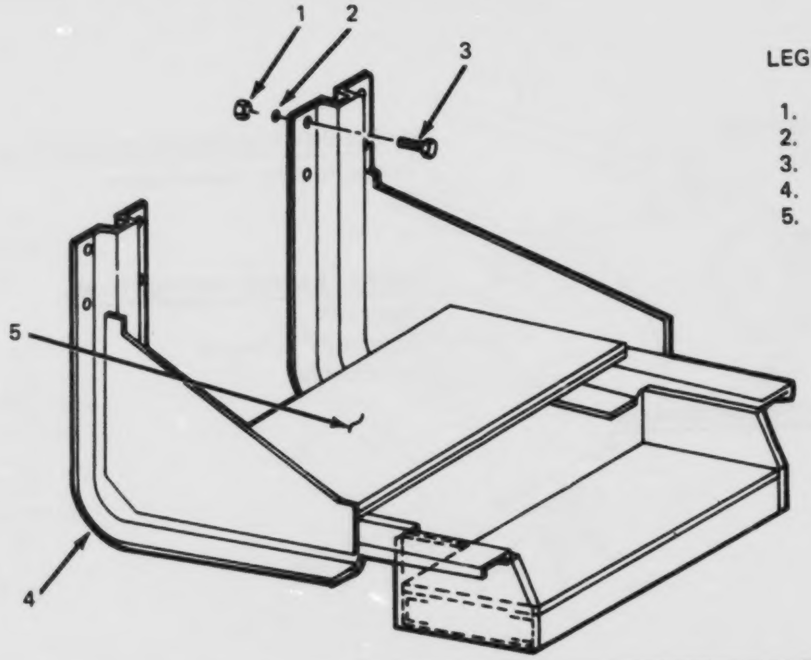
5-42. BATTERY BOX MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Spacer (5).	Remove.	
2. Eight nuts (1), washers (2) and bolts (3).	Remove.	
3. Battery box (4).	Remove.	
B. INSTALLATION.		
4. Battery box (4).	Position and hold.	
5. Eight bolts (3), washers (2) and nuts (1).	Install and tighten.	
6. Spacer (5).	Set in place.	

NOTE

Follow-on maintenance action required:

a. Install batteries, refer to para 5-38E.
b. Install air reservoir; refer to para 9-16B.



LEGEND:

1. NUT (8)
2. WASHER (8)
3. BOLT (8)
4. BOX
5. SPACER

TA 074752

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(15)
b.	Installation.	(20)
c.	Operational Check.	(5)
		40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
11-14 A&C.	Right Front Fender Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-5.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.

Transmission in Neutral.

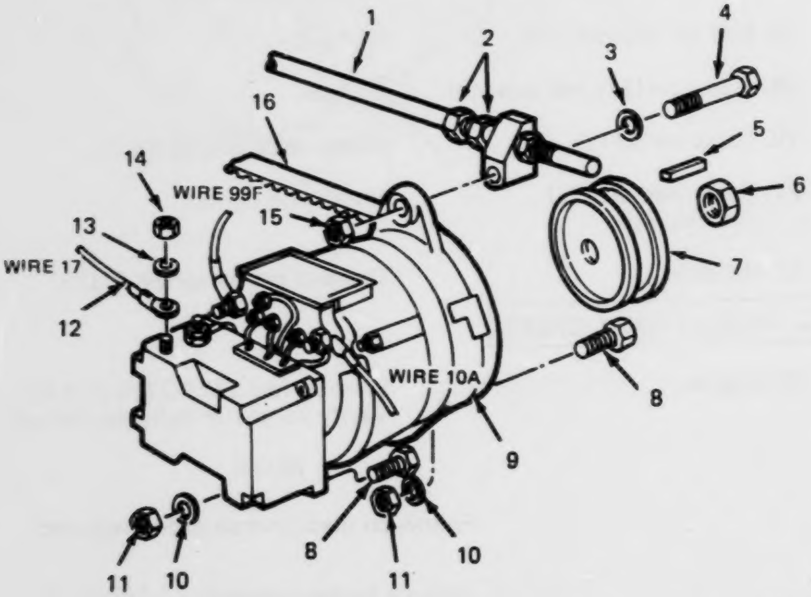
Park Brake Set.

5-43. ALTERNATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three nuts (14) and washers (13).	Remove.	
2. Three wires (12).	Remove.	
3. Adjusting nuts (2).	Unscrew to release tension on alternator (9).	
4. Bolt (4), washer (3) and nut (15).	Remove.	
5. Adjustment rod (1).	Raise out of way.	
6. Two nuts (11).	Loosen, but do not remove.	
7. Alternator (9).	Move towards engine and remove two belts (16).	
8. Two nuts (11), washers (10) and bolts (8).	Remove slowly while holding alternator (9) in place.	
9. Alternator (9).	Remove.	

LEGEND:

1. ROD
2. NUT (2)
3. WASHER
4. BOLT
5. KEY
6. NUT
7. PULLEY
8. BOLT (2)
9. ALTERNATOR
10. WASHER (2)
11. NUT (2)
12. WIRE (3)
13. WASHER (3)
14. NUT (3)
15. NUT
16. BELT (2)



TA 074753

BATTERIES AND ALTERNATOR.

5-43. ALTERNATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
10. Nut (6), key (5), and pulley (7).	Remove from alternator shaft.	
B. INSTALLATION.		
11. Pulley (7), key (5), and nut (6).	Install on alternator shaft.	Transfer parts if not damaged.
12. Alternator (9).	Aline and hold in place.	
13. Two bolts (8), washers (10) and nuts (11).	Install, but do not tighten.	
14. Adjustment rod (1).	Lower and aline with mounting hole on alternator (9).	
15. Bolt (4), washer (3) and nut (15).	Install but do not tighten.	
16. Alternator (9).	Push towards engine and replace two belts (16).	
17. Adjusting nuts (2).	Tighten until proper tension is applied to belts (16) (Refer to para 4-55).	
18. Bolt (4) and nut (15).	Tighten.	
19. Two nuts (11) and bolts (8).	Tighten.	
20. Three wires (12).	Install according to figure.	
21. Three washers (13) and nuts (14).	Install and tighten.	
22. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
23. Engine	Start up (see TM 9-2320-273-10). Verify voltmeter indicates normal.	

NOTE

Follow-on maintenance action required:

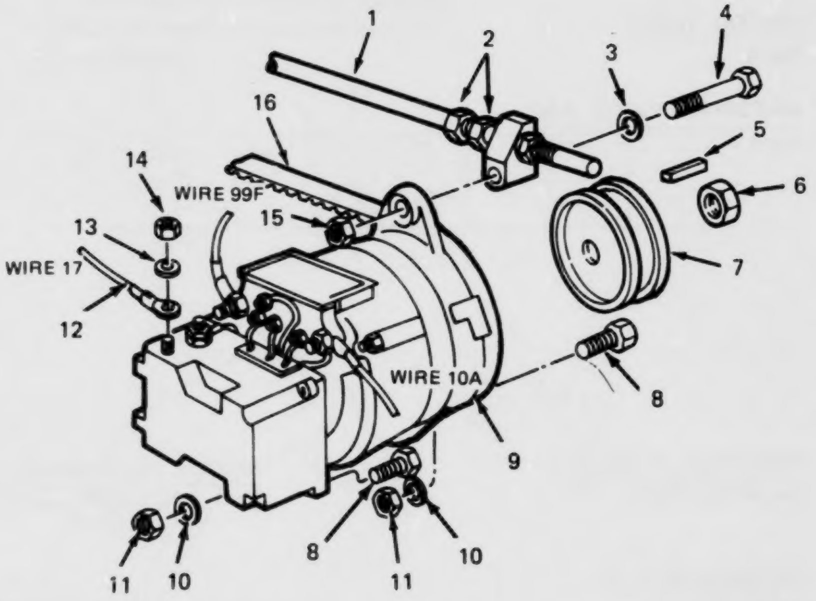
Replace fender paragraph 11-14B or D.

5-43. ALTERNATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. ROD
2. NUT (2)
3. WASHER
4. BOLT
5. KEY
6. NUT
7. PULLEY
8. BOLT (2)
9. ALTERNATOR
10. WASHER (2)
11. NUT (2)
12. WIRE (3)
13. WASHER (3)
14. NUT (3)
15. NUT
16. BELT (2)


1
2
3
4
16
14
WIRE 99F
5
6
15
13
WIRE 17
7
12
WIRE 10A
8
9
8
11
10
10
11

TA 074754

EXTERIOR LIGHTING MAINTENANCE.

5-44. HEADLAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
c. Operational Check.	(2)
	22 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-8.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

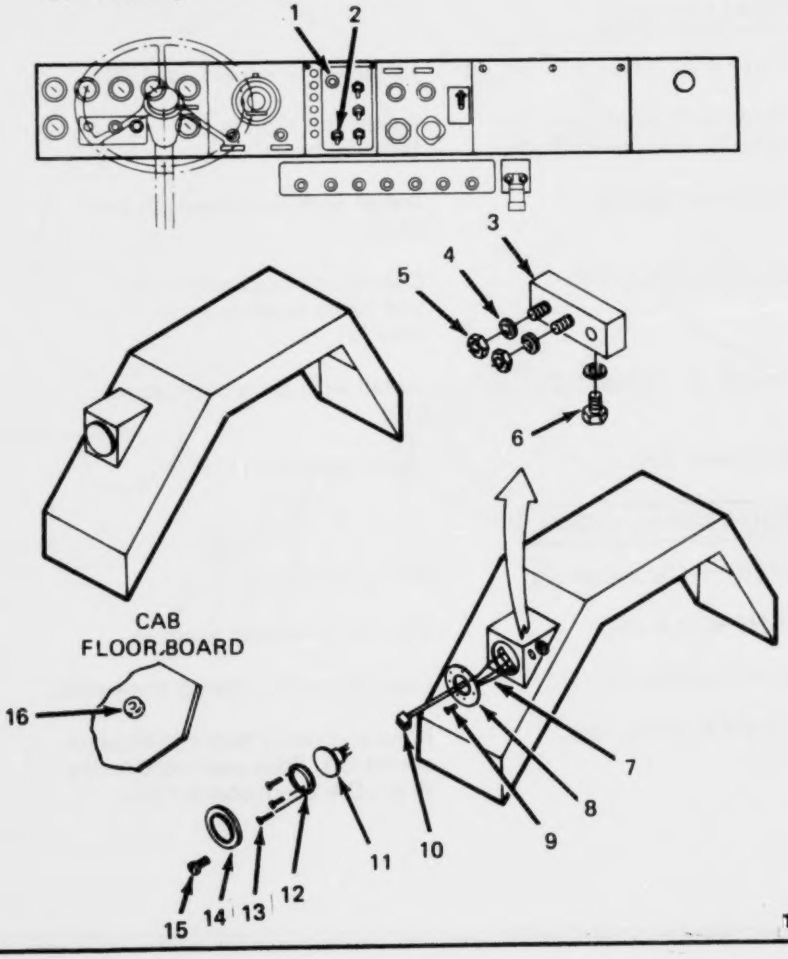
EXTERIOR LIGHTING.

5-44. HEADLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (15).	Remove.	
2. Rim cover (14).	Remove by pushing up and pulling outward to release spring clip.	

NOTE

Do not remove spring and two screws which hold inner and outer bases together as headlight re-alinement will be necessary.



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. TERMINAL BOARD
4. WASHER (3)
5. NUT (2)
6. BOLT
7. WIRE (3)
8. HEADLAMP BASE
9. SCREW (6)
10. WIRE CONNECTOR
11. HEADLAMP
12. HEADLAMP RETAINER
13. SHORT SCREW (3)
14. RIM COVER
15. SCREW
16. DIMMER SWITCH

EXTERIOR LIGHTING.

5-44. HEADLAMPS MAINTENANCE (Continued).

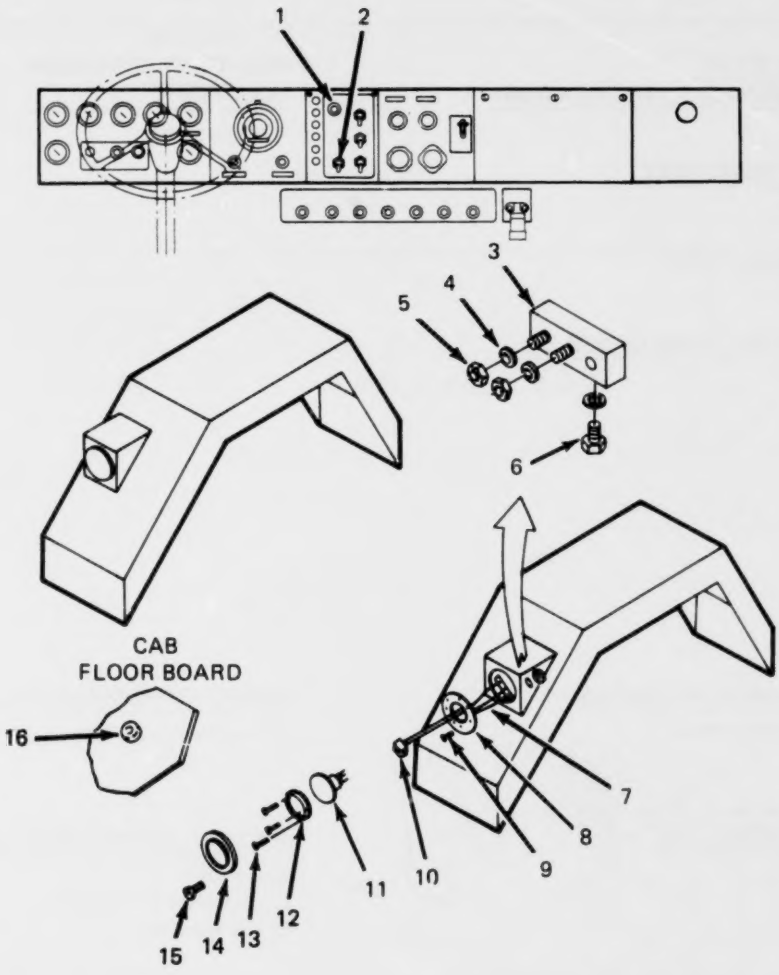
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Three short screws (13).	a. Remove b. Remove headlamp retainer (12).	
4. Headlamp (11).	Disconnect wire connector (10) and remove.	
5. Six screws (9).	Remove.	
6. Headlamp base (8).	Remove.	
7. Two nuts (5), one bolt (6) and three washers (4).	Remove three headlamp wires (7) from terminal board (3).	
B. INSTALLATION.		
8. Three wires (7).	Install on terminal board (3).	
9. Three washers (4) and two nuts (5), and one bolt (6).	Install and tighten on terminal board (3).	
10. Headlamp base (8).	Install with six screws (9) and aline.	
11. Wire connector (10).	Connect to headlamp (11) and insert headlamp into base (8).	
12. Headlamp retainer (12).	Install with three short screws (13).	
13. Rim cover (14).	Install with screw (15).	
C. OPERATIONAL CHECK.		
14. OPERATION switch (2).	Set to NORMAL.	
15. LAMP switch (1).	Pull ON to second position.	
16. HEADLAMP (11).	Observe that headlamp comes ON.	
17. DIMMER switch (16).	Press and verify that HIGH beam comes ON. Press again and verify that LOW beam comes ON.	

5-44. HEADLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. TERMINAL BOARD
4. WASHER (3)
5. NUT (2)
6. BOLT
7. WIRE (3)
8. HEADLAMP BASE
9. SCREW (6)
10. WIRE CONNECTOR
11. HEADLAMP
12. HEADLAMP RETAINER
13. SHORT SCREW (3)
14. RIM COVER
15. SCREW
16. DIMMER SWITCH


1
2
3
4
5
6
CAB
FLOOR BOARD
16
7
8
9
10
11
12
13
14
15

TA 074756

EXTERIOR LIGHTING.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(6)
b. Installation.	(6)
c. Operational Check,	(1)
	13 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-9, 5-11.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

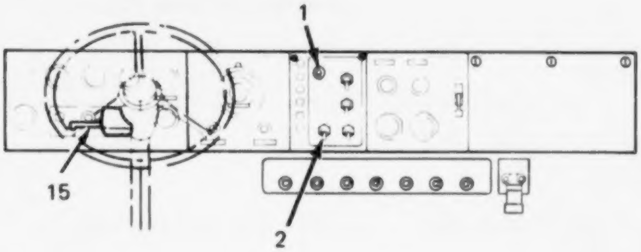
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).

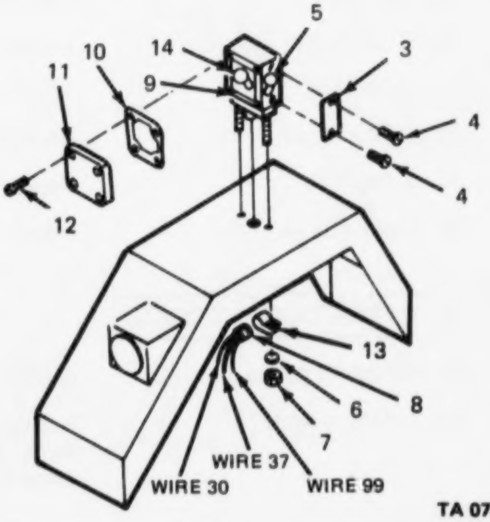
A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four screws (12).	Remove.	
2. Lens (11).	Remove.	
3. Gasket (10).	Remove.	
4. Bulb (14).	Remove.	



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. LENS
4. SCREW (2)
5. BULB
6. WASHER (2)
7. NUT (2)
8. WIRE CONNECTOR
9. FRONT TURN AND MARKER LAMP
10. GASKET
11. LENS
12. SCREW (4)
13. WIRE CLAMP
14. BULB
15. TURN SIGNAL CONTROL


5
14
10
3
11
9
4
4
12
13
8
6
7
WIRE 37
WIRE 30
WIRE 99

TA 074757

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).

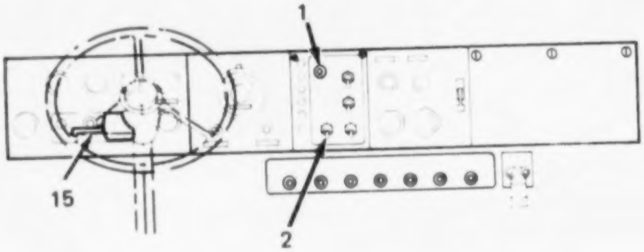
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two screws (4).	Remove.	
6. Lens (3).	Remove.	
7. Bulb (5).	Remove.	
8. Two nuts (7), washers (6) and wire clamp (13).	Remove.	
9. Wire connector (8).	Remove from front turn and marker lamp (9).	
10. Front turn and marker lamp (9).	Remove.	
B. INSTALLATION.		
11. Front turn and marker lamp (9).	Aline in mounting holes.	
12. Two washers (6), nuts (7) and wire clamp (13).	Install and tighten.	
13. Wire connector (8).	Connect to front turn and marker lamp (9).	
14. Bulb (5).	Insert and turn to tighten.	
15. Lens (3).	Replace and aline.	
16. Two screws (4).	Install and tighten.	
17. Bulb (14).	Insert and turn to tighten.	
18. Gasket (10).	Replace and aline.	
19. Lens (11).	Replace and aline.	
20. Four screws (12).	Install and tighten.	
C. C. OPERATIONAL CHECK.		
21. OPERATION switch (2).	Set to NORMAL.	
22. LAMP switch (1).	Pull out to first notch and verify that marker lamps (9) come ON.	

EXTERIOR LIGHTING.

5-45. FRONT TURN AND MARKER LAMPS MAINTENANCE (Continued).

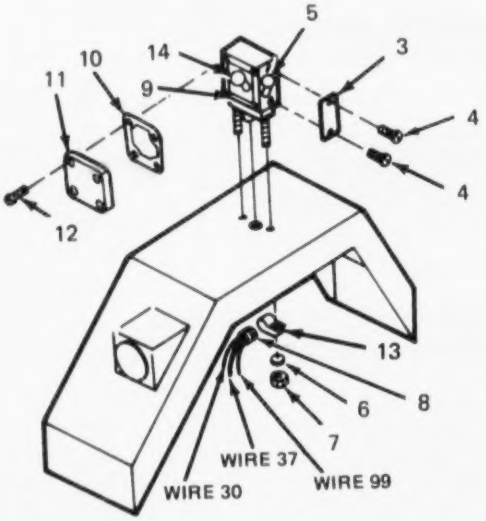
C. OPERATIONAL CHECK (Continued).

LOCATION/ITEM	ACTION	REMARKS
23. Turn signal control (15).	Push lever down. Verify that left turn lamp flashes.	
24. Turn signal control (15).	Push lever up. Verify that right turn lamp flashes.	



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. LENS
4. SCREW (2)
5. BULB
6. WASHER (2)
7. NUT (2)
8. WIRE CONNECTOR
9. FRONT TURN AND MARKER LAMP
10. GASKET
11. LENS
12. SCREW (4)
13. WIRE CLAMP
14. BULB
15. TURN SIGNAL CONTROL.



TA 074758

EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

1. Non-Flammable Cleaning Solvent (Refer to Appendix C).
2. Bearing Grease; GAA (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 5-10.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

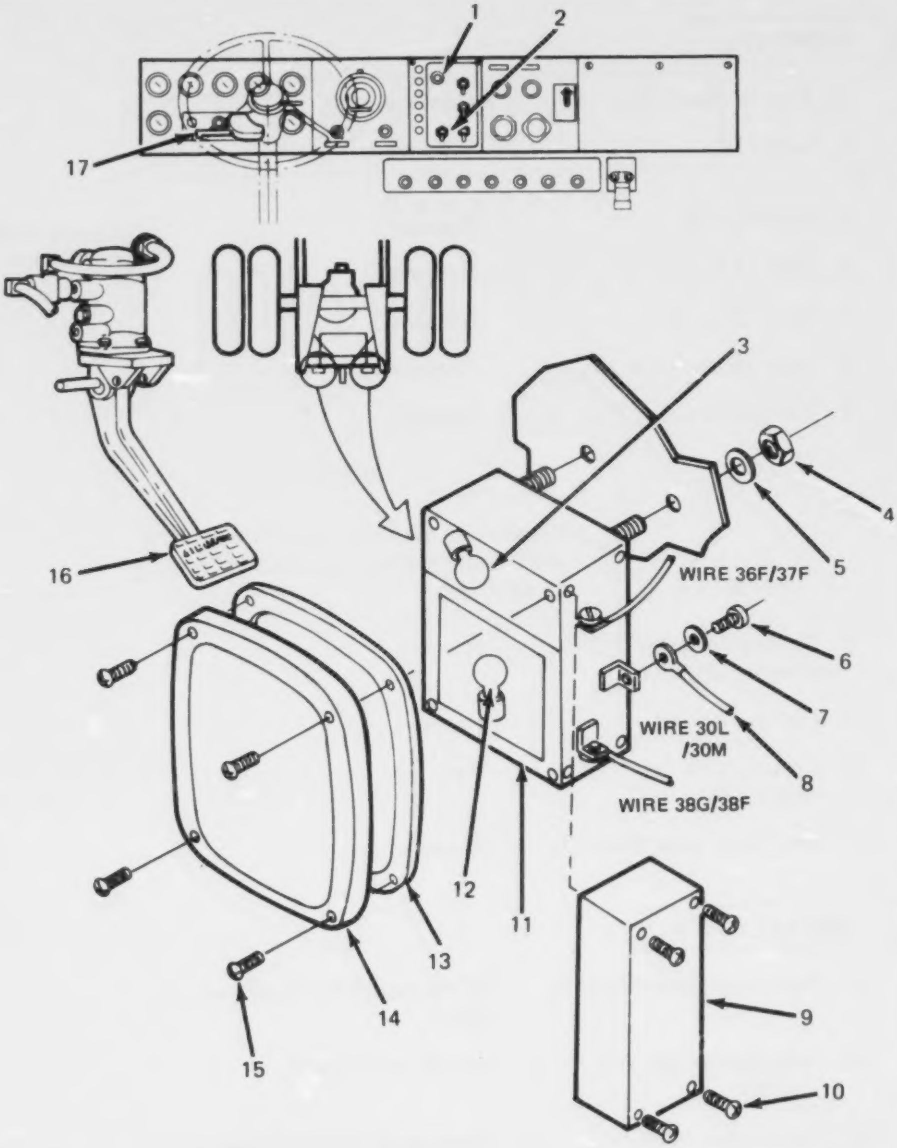
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
17
3
4
5
WIRE 36F/37F
6
7
WIRE 30L /30M
8
WIRE 38G/38F
16
12
11
13
14
15
9
10

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. BULB
4. NUT (2)
5. WASHER (2)
6. SCREW (3)
7. WASHER (3)
8. WIRE (3)
9. TERMINAL COVER
10. SCREW (4)
11. REAR LAMP ASSEMBLY
12. BULB
13. GASKET
14. LENS
15. SCREW (4)
16. BRAKE PEDAL
17. TURN SIGNAL CONTROL

TA 074759

EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (15).	Remove.	
2. Lens (14).	Remove.	
3. Gasket (13).	Remove.	Discard if cracking or tears are evident.
4. Bulb (12).	Remove.	
5. Bulb (3).	Remove.	
6. Four screws (10).	Remove.	
7. Terminal cover (9).	Remove.	

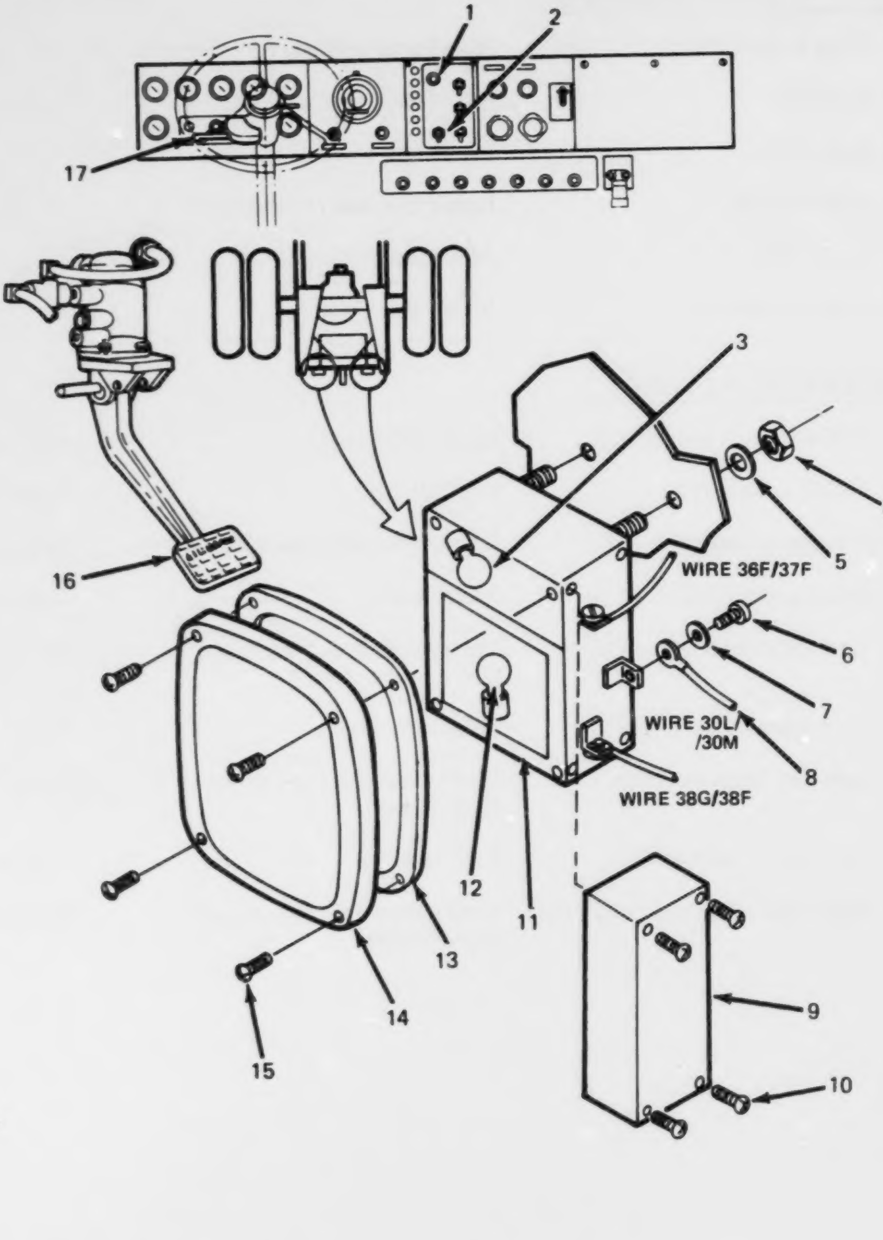
NOTE

Remove grease from wire connections with cleaning solvent before proceeding to next step.

LOCATION/ITEM	ACTION	REMARKS
8. Three screws (6) and washers (7).	Remove.	
9. Three wires (8).	Remove.	
10. Two nuts (4) and washers (5).	Remove.	
11. Rear lamp assembly (11).	Remove.	
B. INSTALLATION.		
12. Rear lamp assembly (11).	Aline mounting studs and install.	
13. Two washers (5) and nuts (4).	Install and tighten.	
14. Three wires (8).	Replace on rear lamp assembly according to figure.	
15. Three washers (7) and screws (6).	Install and tighten.	
16. Terminal cover (9).	Fill with bearing grease; then, aline and install.	

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
17
3
16
4
5
WIRE 36F/37F
6
7
WIRE 30L/
/30M
8
WIRE 38G/38F
12
11
13
14
15
9
10

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. BULB
4. NUT (2)
5. WASHER (2)
6. SCREW (3)
7. WASHER (3)
8. WIRE (3)
9. TERMINAL COVER
10. SCREW (4)
11. REAR LAMP ASSEMBLY
12. BULB
13. GASKET
14. LENS
15. SCREW (4)
16. BRAKE PEDAL
17. TURN SIGNAL CONTROL

TA 074760

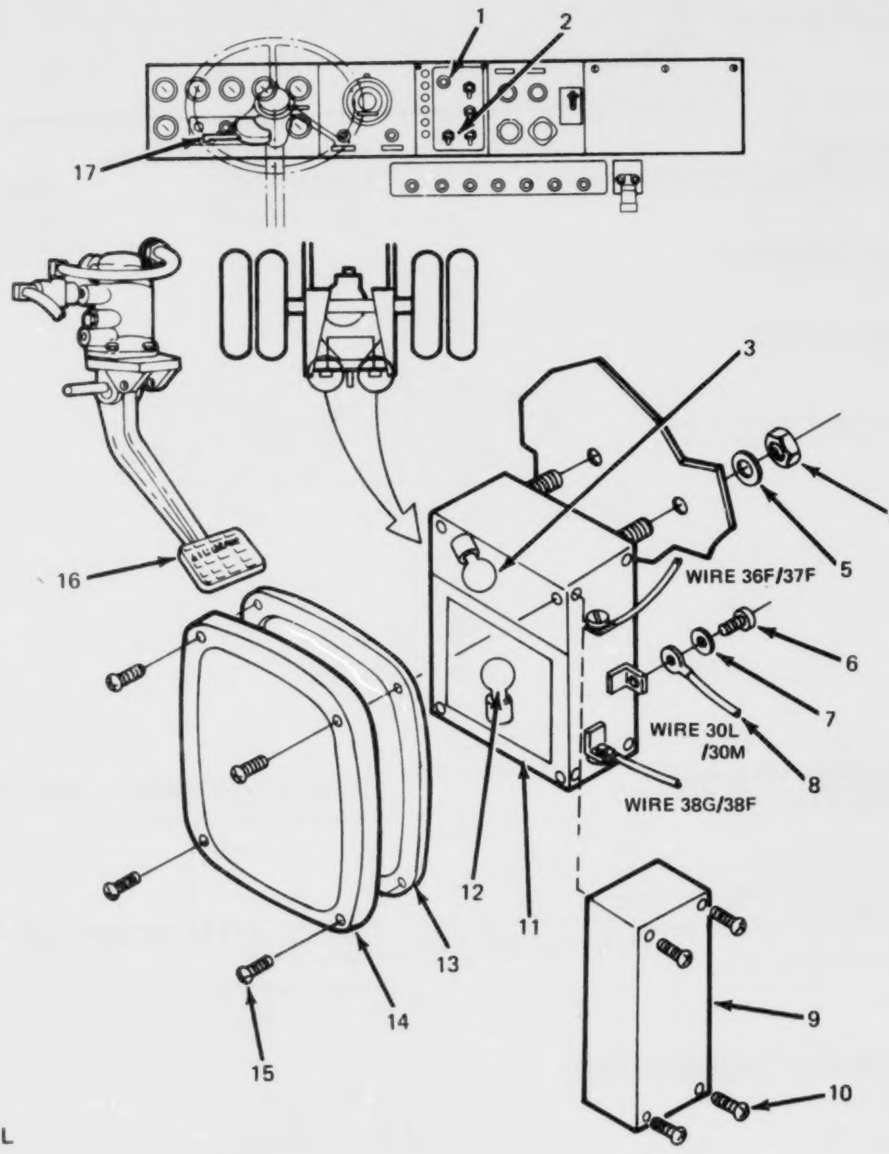
EXTERIOR LIGHTING.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
17. Four screws (10).	Install and tighten.	
18. Bulb (3).	Insert and twist to tighten.	
19. Bulb (12).	Insert and twist to tighten.	
20. Gasket (13).	Install if it was removed.	
21. Lens (14).	Aline and install.	
22. Four screws (15).	Install and tighten.	
C. OPERATIONAL CHECK.		
23. OPERATION switch (2).	Set to NORMAL.	First mechanic.
24. LAMP switch (1).	Pull ON.	First mechanic.
25. Rear lamp assembly (11).	Verify that lights go ON.	Second mechanic.
26. Brake pedal (16).	Press down.	First mechanic.
27. Rear lamp assembly (11).	Verify that brake lights go ON.	Second mechanic.
28. Turn signal control (17).	Press lever down.	First mechanic.
29. Left rear lamp assembly (11).	Verify that left turn signal lamp flashes.	Second mechanic.
30. Turn signal control (17).	Push lever up.	First mechanic.
31. Right rear lamp assembly (11).	Verify that right turn signal lamp flashes.	Second mechanic.

5-46. REAR LAMP ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
17
3
4
5
WIRE 36F/37F
16
6
7
WIRE 30L /30M
8
WIRE 38G/38F
12
11
13
14
15
9
10

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. BULB
4. NUT (2)
5. WASHER (2)
6. SCREW (3)
7. WASHER (3)
8. WIRE (3)
9. TERMINAL COVER
10. SCREW (4)
11. REAR LAMP ASSEMBLY
12. BULB
13. GASKET
14. LENS
15. SCREW (4)
16. BRAKE PEDAL
17. TURN SIGNAL CONTROL

TA 074761

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation.	(2)
c. Operational Check.	(1)
	5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-9.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

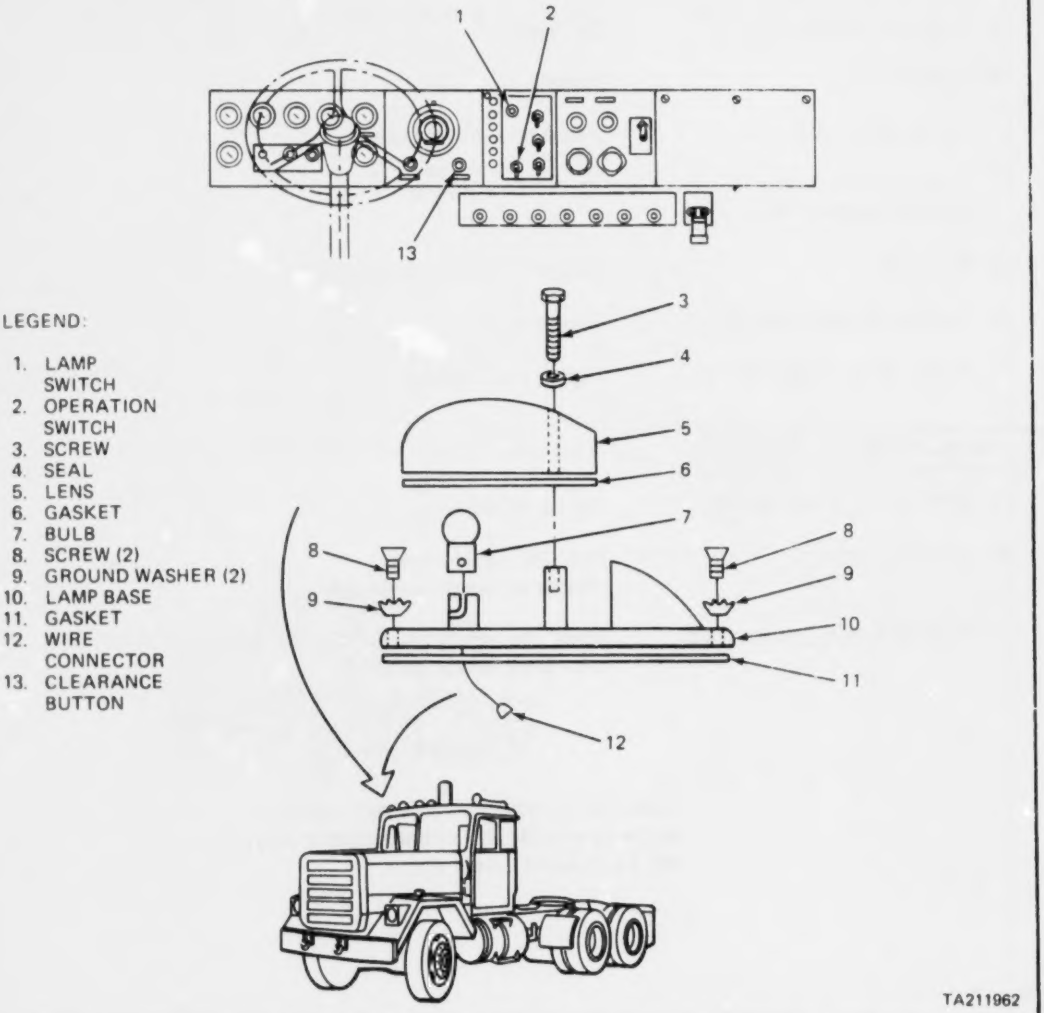
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-47. CLEARANCE LAMPS MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Screw (3) and seal (4).	Remove.	
2. Lens (5) and gasket (6).	Remove.	
3. Bulb (7).	Remove.	
4. Two screws (8) and ground washers (9).	Remove.	



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. SCREW
4. SEAL
5. LENS
6. GASKET
7. BULB
8. SCREW (2)
9. GROUND WASHER (2)
10. LAMP BASE
11. GASKET
12. WIRE CONNECTOR
13. CLEARANCE BUTTON

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Lamp base (10).	Remove.	
6. Gasket (11).	Remove.	Discard if cracking or tears are evident.
7. Wire connector (12).	Disconnect.	
B. INSTALLATION.		
8. Wire connector (12).	Connect.	
9. Gasket (11).	Install.	
10. Lamp base (10).	Aline mounting holes.	
11. Two screws (8) and ground washers (9).	Install and tighten.	
12. Bulb (7).	Install.	
13. Gasket (6) and lens (5).	Replace.	
14. Screw (3) and seal (4).	Install and tighten.	
C. OPERATIONAL CHECK.		
15. OPERATION switch (2).	Set to NORMAL.	
16. LAMP switch (1).	Pull ON; verify that clearance lamps come on.	
17. CLEARANCE button (13).	Press and verify that clearance lamps go OFF.	

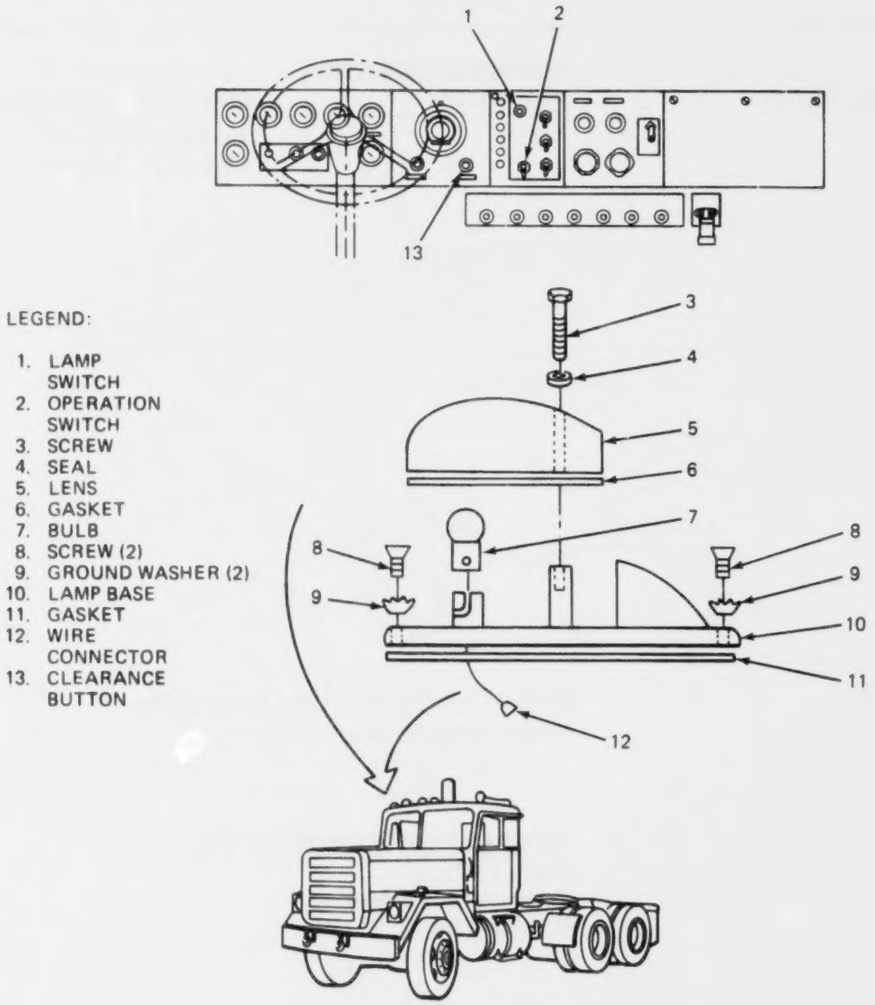
NOTE

Upon completion of this task, apply a suitable windshield sealant over screws (8) to prevent water entry.

EXTERIOR LIGHTING.

5-47. CLEARANCE LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. SCREW
4. SEAL
5. LENS
6. GASKET
7. BULB
8. SCREW (2)
9. GROUND WASHER (2)
10. LAMP BASE
11. GASKET
12. WIRE CONNECTOR
13. CLEARANCE BUTTON

TA211963

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-44A.	Headlamp Removed if Wire (3) is To Be Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-13.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

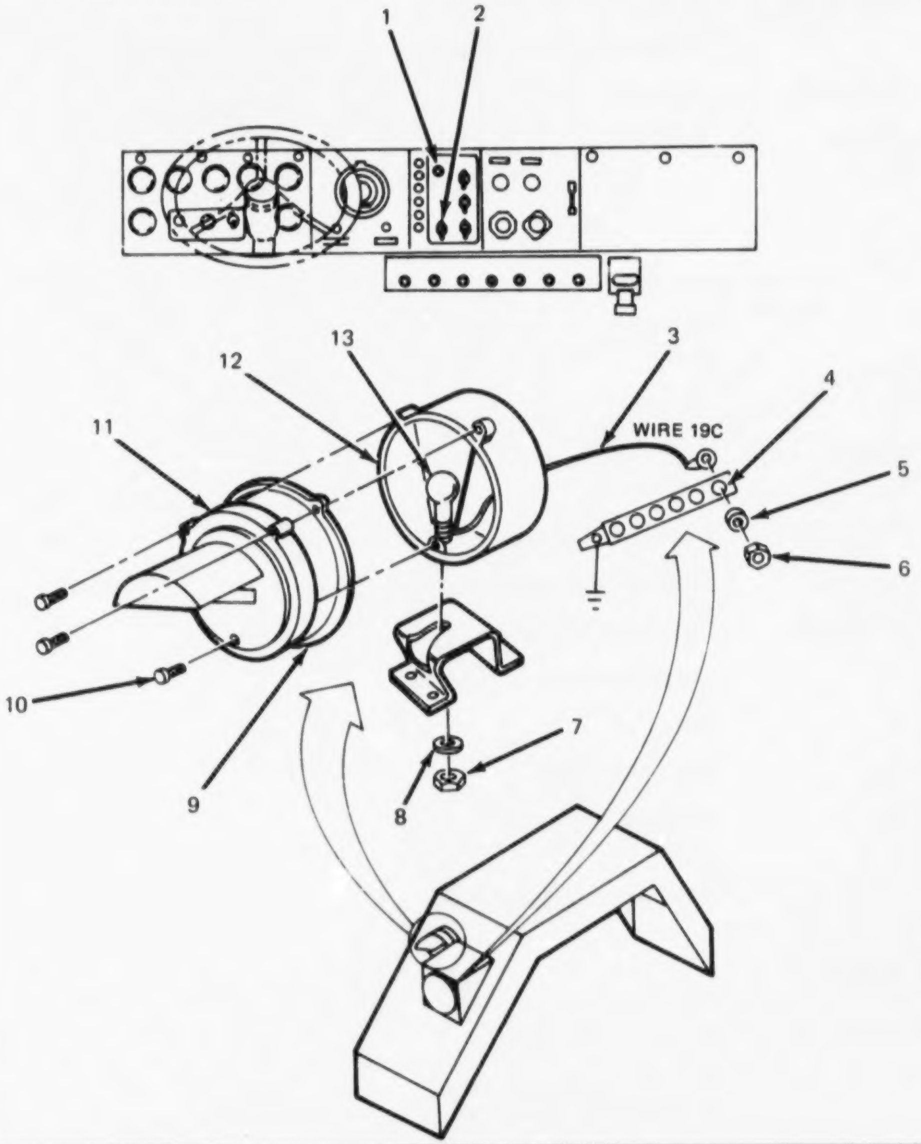
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Three retaining screws (10).	Remove.	
2. Lens cover (11).	Remove.	



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. WIRE
4. TERMINAL
5. WASHER
6. NUT
7. NUT
8. WASHER
9. GASKET
10. RETAINING SCREW (3)
11. LENS COVER
12. BLACKOUT HEADLAMP ASSEMBLY
13. BULB

TA 074764

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Gasket (9).	Remove.	Discard if cracking or tears are evident.
4. Bulb (13).	Remove.	
5. Nut (6) and washer (5).	Remove from terminal (4).	
6. Wire (3).	Remove from terminal (4).	
7. Nut (7) and washer (8).	Remove.	
8. Blackout headlamp assembly (12).	Remove.	

NOTE

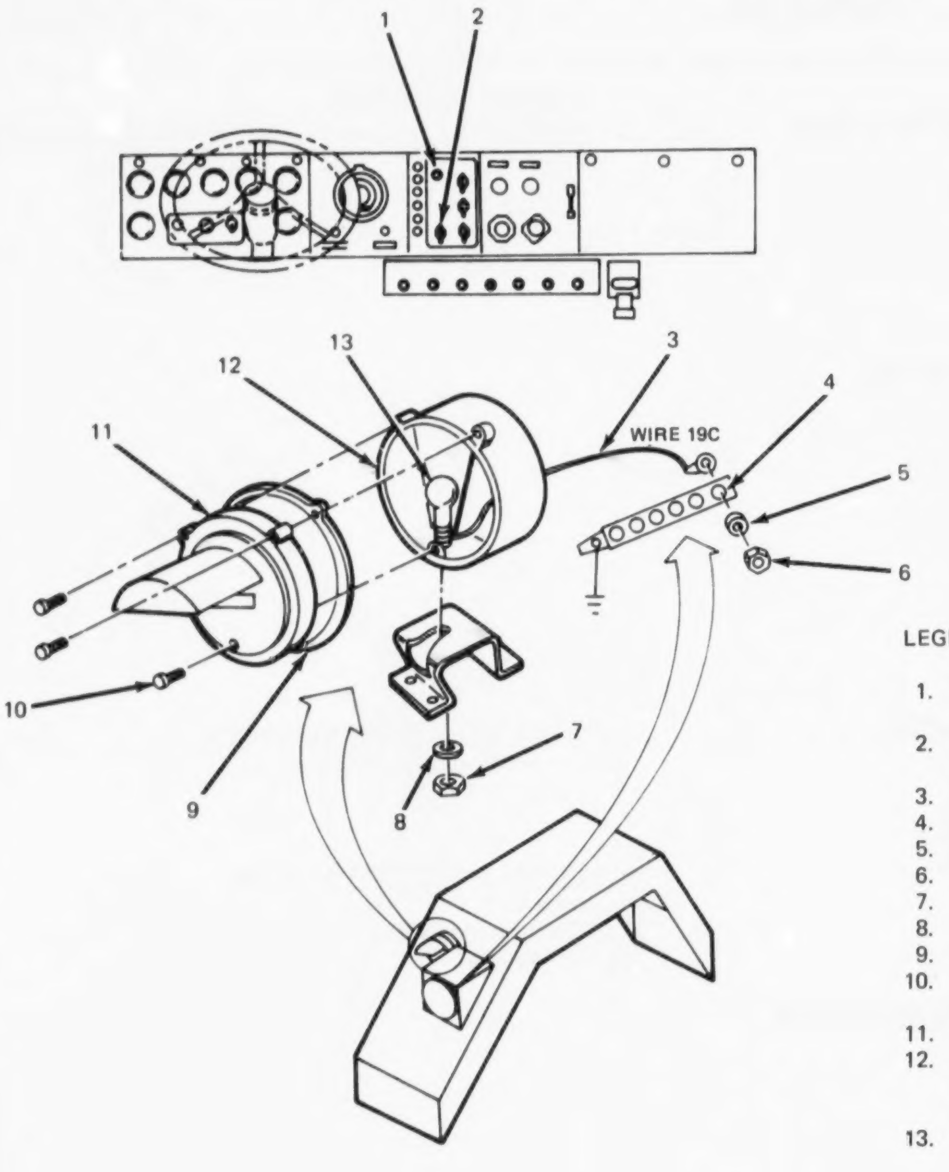
To gain access to terminal block (4) refer to para. 5-44.

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
9. Blackout headlamp assembly (12).	Aline mounting stud and install.	
10. Washer (8) and nut (7).	Install and tighten.	
11. Wire (3).	Connect to terminal (4).	
12. Washer (5) and nut (6).	Install and tighten.	
13. Bulb (13).	Install and twist to tighten.	
14. Gasket (9).	Install.	
15. Lens cover (11).	Aline and install.	
16. Three retaining screws (10).	Tighten.	
17. Headlamp.	Install per paragraph 5-45.	
C. OPERATIONAL CHECK.		
18. OPERATION switch (2).	Set to BLACKOUT.	
19. LAMP switch (1).	Pull ON. Verify that blackout headlamp comes ON.	

EXTERIOR LIGHTING.

5-48. BLACKOUT HEADLAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. WIRE
4. TERMINAL
5. WASHER
6. NUT
7. NUT
8. WASHER
9. GASKET
10. RETAINING SCREW (3)
11. LENS COVER
12. BLACKOUT HEADLAMP ASSEMBLY
13. BULB

TA 074765

EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-13.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-44A.	Headlamp Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

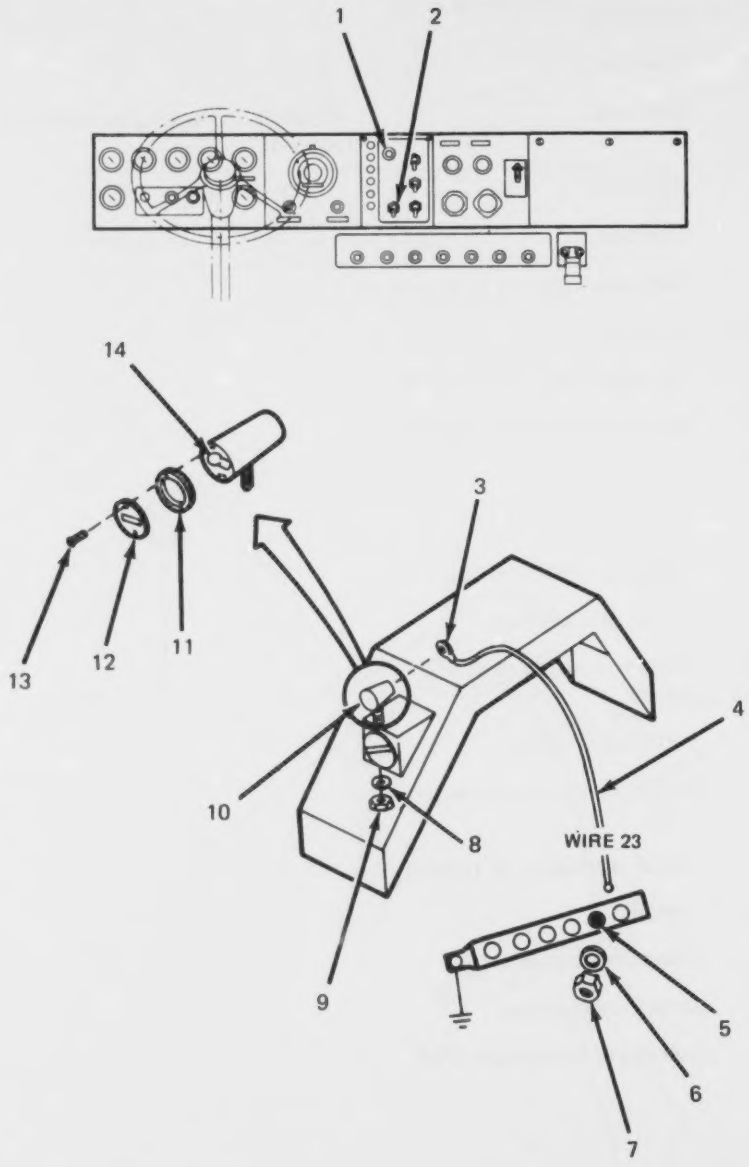
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. WIRE CONNECTOR
4. WIRE
5. TERMINAL
6. WASHER
7. NUT
8. WASHER
9. NUT
10. BLACKOUT MARKER LAMP
11. GASKET
12. LENS COVER
13. SCREW (2)
14. BULB

TA 074766

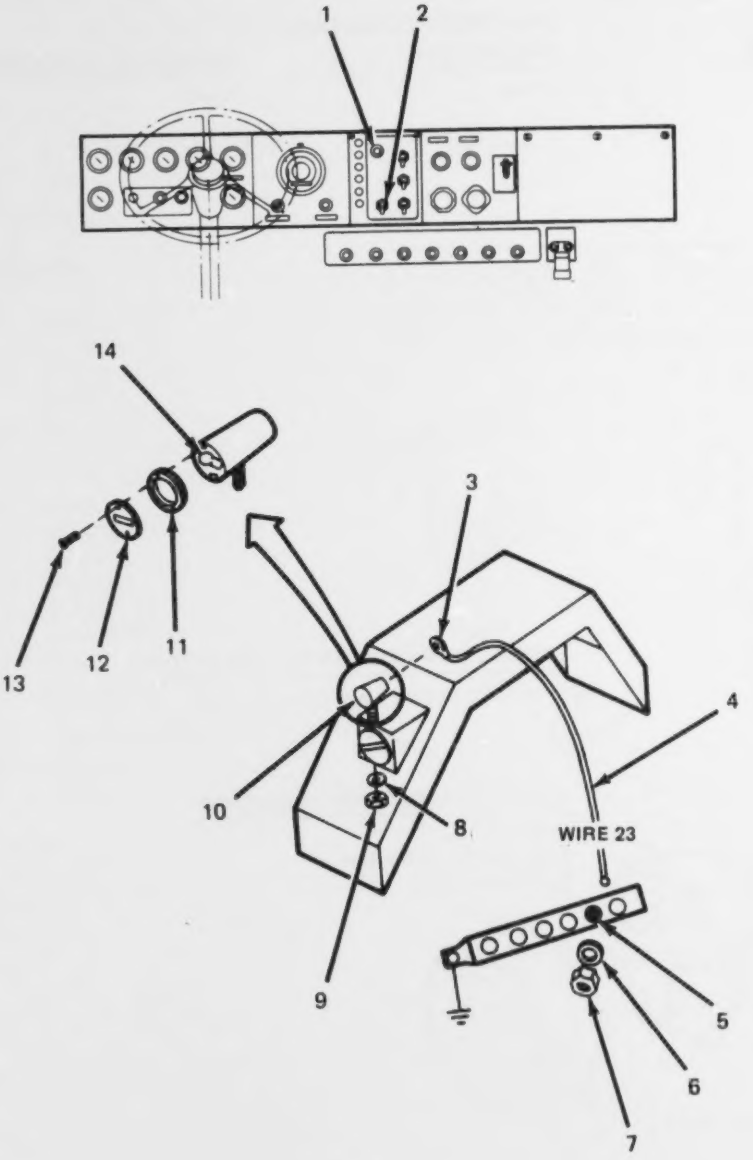
EXTERIOR LIGHTING.

5-49. BLACKOUT MARKER LAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (13).	Remove.	
2. Lens cover (12).	Remove.	
3. Gasket (11).	Remove.	Discard if cracking or tears are evident.
4. Bulb (14).	Remove.	
5. Wire connector (3).	Remove.	
6. Nut (9) and washer (8).	Remove.	
7. Blackout marker lamp (10).	Remove.	
8. Nut (7) and washer (6).	Remove from terminal (5).	
9. Wire (4).	Remove from terminal (5).	
B. INSTALLATION.		
10. Wire (4).	Install on terminal (5).	
11. Washer (6) and nut (7).	Install and tighten.	
12. Blackout marker lamp (10).	Aline mounting stud and install.	
13. Washer (8) and nut (9).	Install and tighten.	
14. Wire connector (3).	Install in blackout marker (10).	
15. Bulb (14).	Install and twist to tighten.	
16. Gasket (11).	Install.	
17. Lens cover (12).	Aline and install.	
18. Two screws (13).	Install and tighten.	
19. Headlamp.	Install per paragraph 5-44.	
C. OPERATIONAL CHECK.		
20. OPERATION switch (2).	Set to BLACKOUT.	

5-49. BLACKOUT MARKER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued).		
21. LAMP switch (1).	Pull On to first position and verify that blackout marker lamp comes ON.	



LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. WIRE CONNECTOR
4. WIRE
5. TERMINAL
6. WASHER
7. NUT
8. WASHER
9. NUT
10. BLACKOUT MARKER LAMP
11. GASKET
12. LENS COVER
13. SCREW (2)
14. BULB

TA 074767

EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-13.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

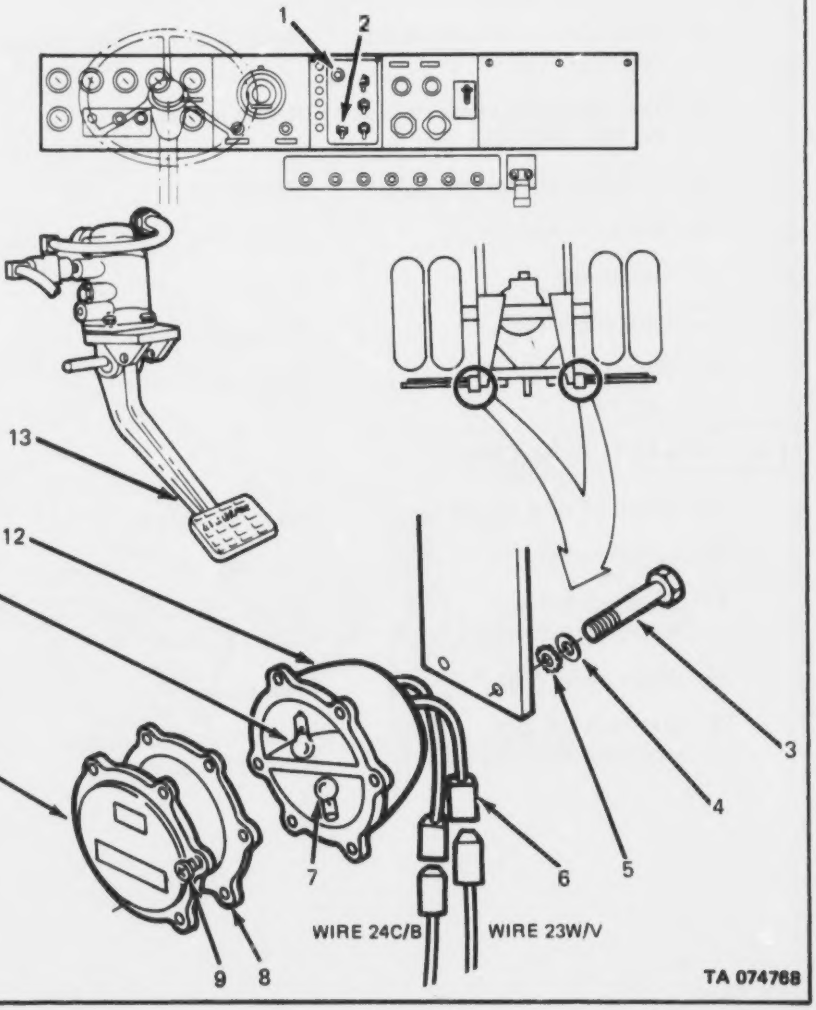
EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six screws (9).	Loosen from blackout tail and stoplamp assembly (12).	Screws (9) cannot be removed from lens cover (10).
2. Lens cover (10).	Remove.	
3. Gasket (8).	Remove.	Discard if cracking or tears are evident.
4. Bulbs (7) and (11).	Remove.	

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. BOLT (2)
4. WASHER (2)
5. STAR WASHER (2)
6. WIRE CONNECTOR (2)
7. BULB
8. GASKET
9. SCREW (6)
10. LENS COVER
11. BULB
12. BLACKOUT TAIL AND STOPLAMP ASSEMBLY (2)
13. BRAKE PEDAL



EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two wire connectors (6).	Disconnect.	
6. Two bolts (3), washers (4), and star washers (5).	Remove.	
7. Blackout tail and stoplamp assembly (12).	Remove.	
B. INSTALLATION.		
8. Blackout tail and stoplamp assembly (12).	Aline with mounting holes.	
9. Two star washers (5), washers (4) and bolts (3).	Install and tighten.	
10. Two wire connectors (6).	Reconnect.	
11. Bulbs (7) and (11).	Install and twist to tighten.	
12. Gasket (8).	Install.	
13. Lens cover (10).	Aline and install.	
14. Six screws (9).	Install and tighten.	
C. OPERATIONAL CHECK.		
15. OPERATION switch (2).	Set to BLACKOUT.	First mechanic.
16. LAMP switch (1).	Pull ON.	First mechanic.
17. Blackout tail and stoplamp assembly (12).	Verify that both tail lights (7) come ON.	Second mechanic.
18. Brake pedal (13).	Press down.	First mechanic.
19. Blackout tail and stoplamp assembly (12).	Verify that both brake lamps (11) come ON.	Second mechanic.

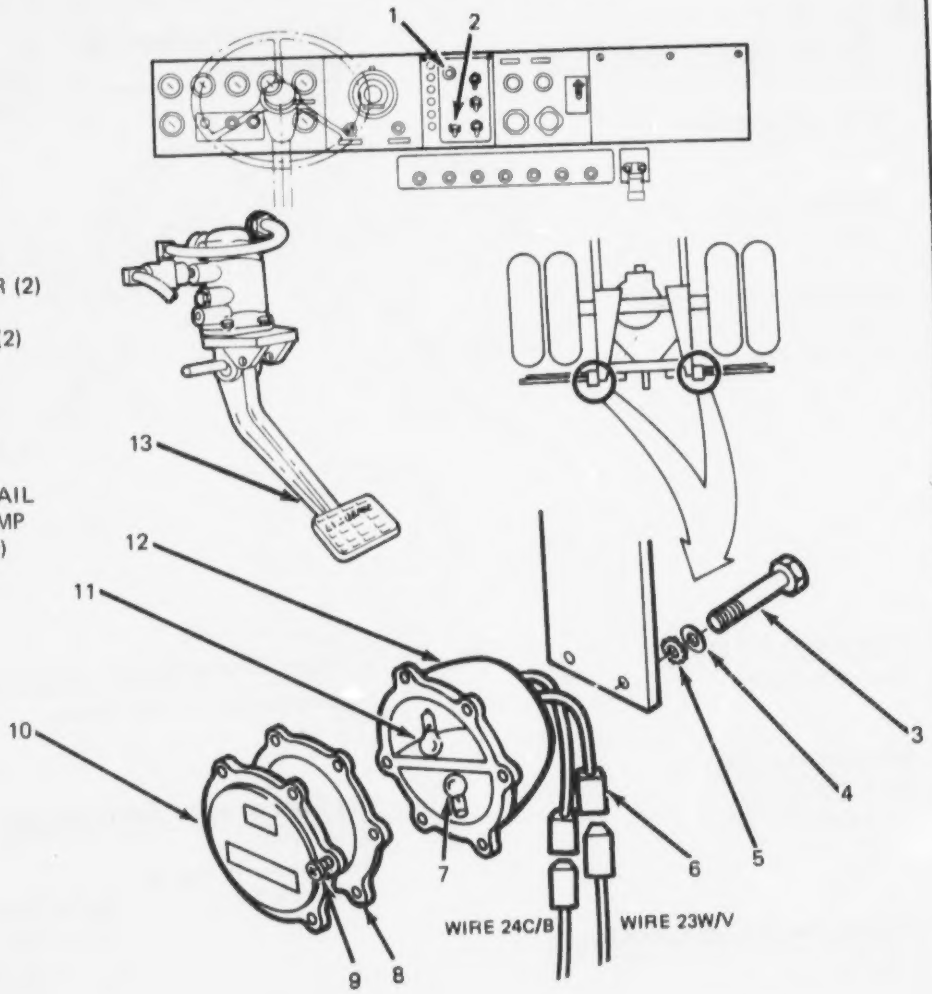
EXTERIOR LIGHTING.

5-50. BLACKOUT TAIL AND STOPLAMPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. BOLT (2)
4. WASHER (2)
5. STAR WASHER (2)
6. WIRE CONNECTOR (2)
7. BULB
8. GASKET
9. SCREW (6)
10. LENS COVER
11. BULB
12. BLACKOUT TAIL AND STOPLAMP ASSEMBLY (2)
13. BRAKE PEDAL


1
2
13
12
11
10
3
4
5
6
7
9
8
WIRE 24C/B
WIRE 23W/V

TA 074769

EXTERIOR LIGHTING.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

35W 12V GE4419
(or equal) Bulb.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

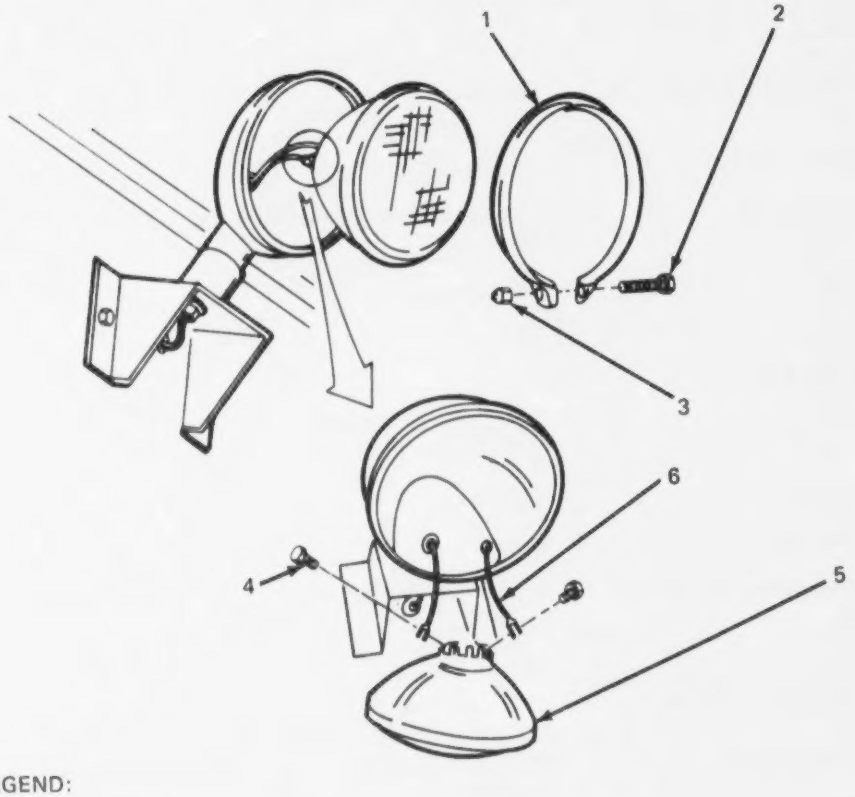
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

EXTERIOR LIGHTING.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RETAINER RING
2. MACHINE SCREW
3. HEX NUT
4. SCREW (2)
5. BULB
6. WIRE (2)

TA 074770

EXTERIOR LIGHTING.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

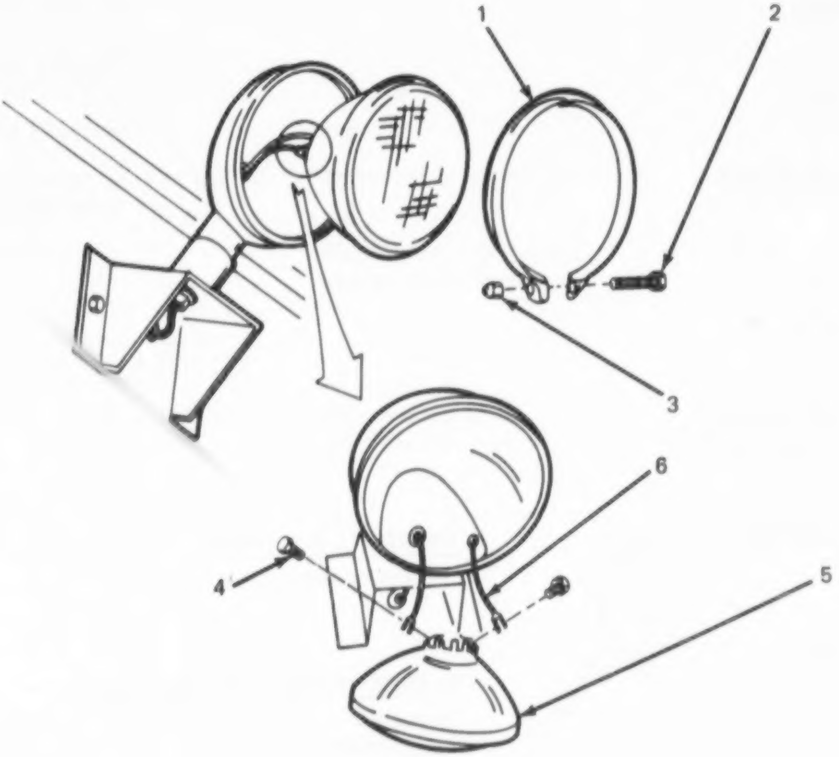
NOTE

Prior to the removal of the bulb make certain that the work lamp switch is in the OFF position.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Machine screw (2) and hex nut (3).	Remove.	
2. Retainer ring (1).	Remove.	
3. Two screws (4).	Loosen and remove wires (6).	
4. Bulb (5).	Remove.	
B. INSTALLATION.		
5. Bulb (5).	Hold in position and install wires (6).	
6. Two screws (4).	Tighten.	
7. Retainer ring (1).	Install.	
8. Machine screw (2) and hex nut (3).	Install and tighten.	
C. OPERATIONAL CHECK.		
9. Work lamp switch.	Place switch in ON position.	Check to see that lamp is lit.

5-51. STATIONARY WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RETAINER RING
2. MACHINE SCREW
3. HEX NUT
4. SCREW (2)
5. BULB
6. WIRE (2)

TA 074771

EXTERIOR LIGHTING.

5-52. STATIONARY WORK LAMP REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(15)
c. Operational Check.	(2)
	27 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

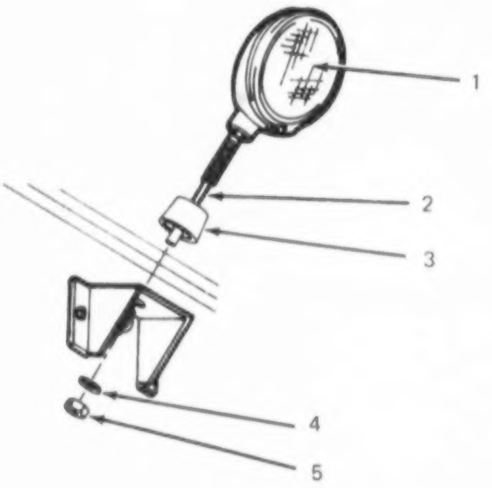
Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-52. STATIONARY WORK LAMP REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire (2).	Cut and remove connectors.	
2. Hex nut (5) and lockwasher (4).	Remove.	
3. Cone spacer (3).	Remove.	
4. Lamp assembly (1).	Remove.	
B. INSTALLATION.		
5. Lamp assembly (1).	Install.	
6. Cone spacer (3), hex nut (5) and lockwasher (4).	Install. Tighten nut.	
7. Wire (2).	Reconnect, using suitable electrical connectors.	
C. OPERATIONAL CHECK.		
8. WORK LAMP switch.	Place switch in ON position.	Check to see that lamp is lit.

LEGEND:

1. LAMP ASSEMBLY
2. WIRE
3. CONE SPACER
4. LOCKWASHER
5. HEX NUT



TA 074772

EXTERIOR LIGHTING.

5-53. PORTABLE WORK LAMP BULB REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

35W 12V GE4419
(or equal) Bulb.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

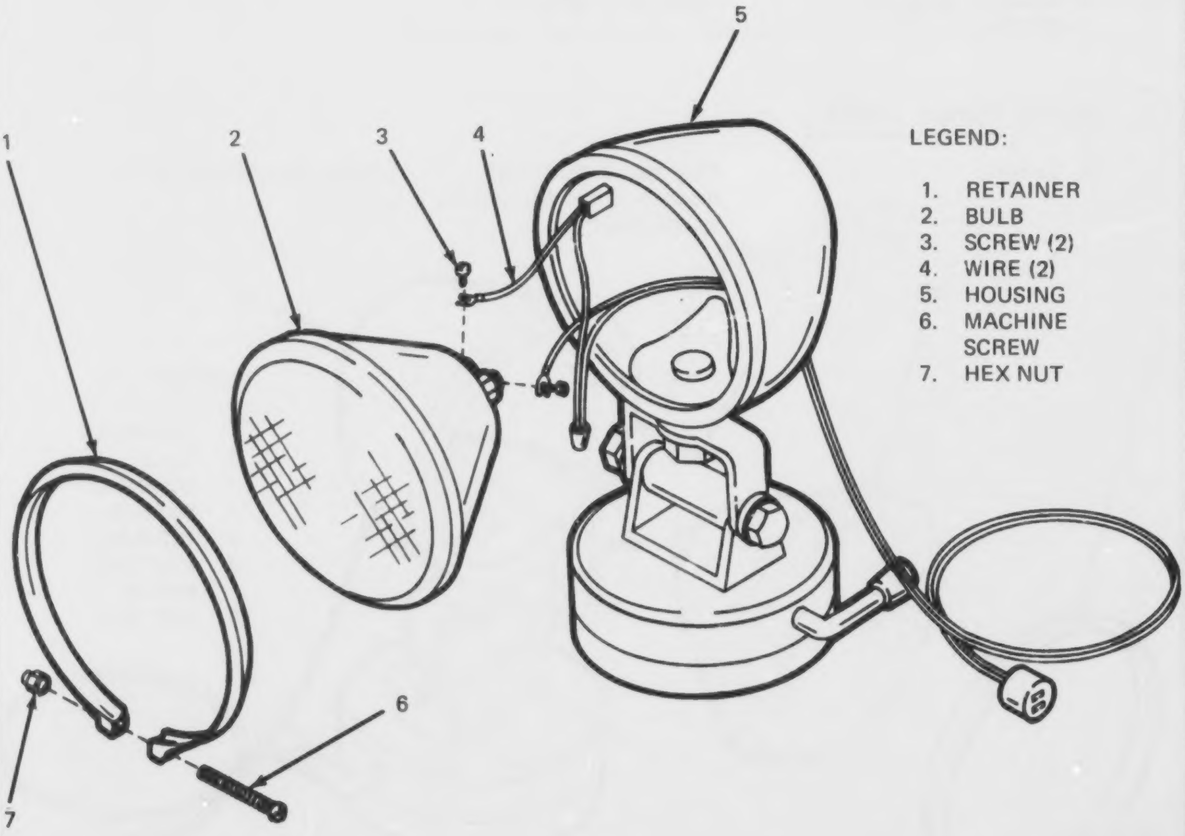
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-53. PORTABLE WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Machine screw (6) and hex nut (7).	Remove.	
2. Retainer (1).	Remove from housing (5).	
3. Two screws (3).	Loosen and remove two wires (4).	
4. Bulb (2).	Remove.	



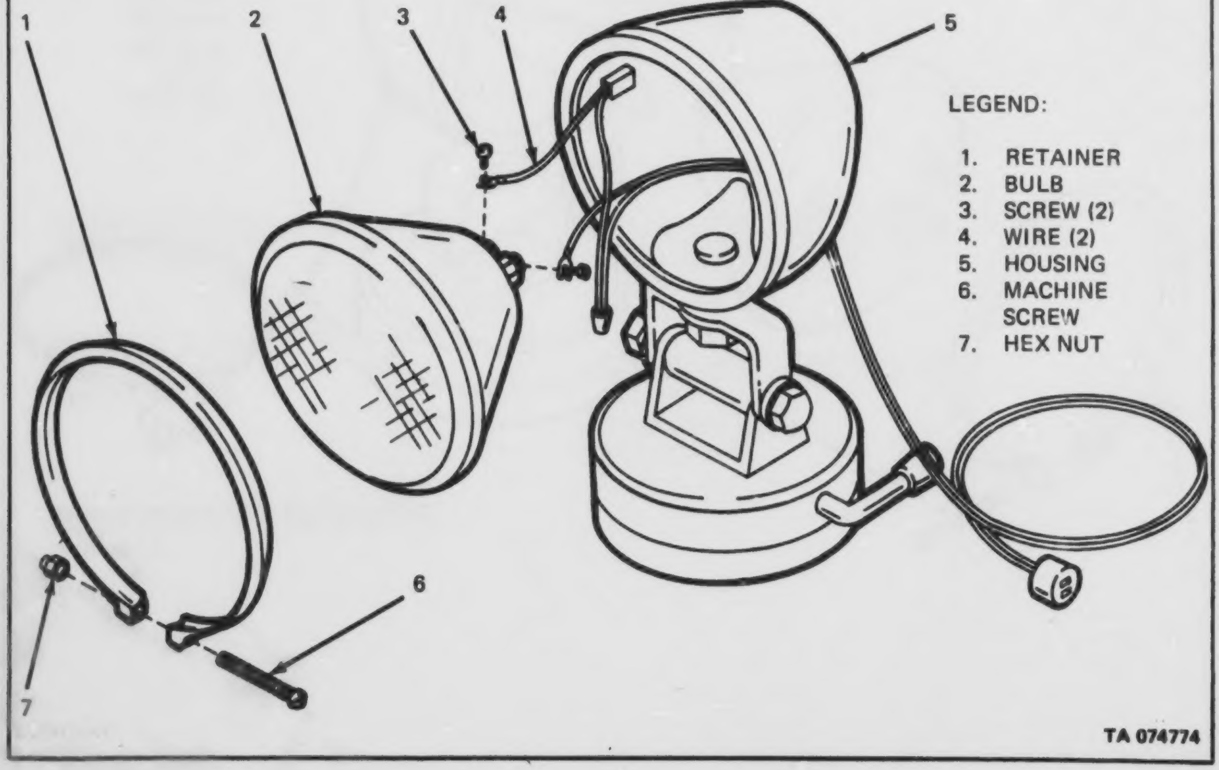
LEGEND:

1. RETAINER
2. BULB
3. SCREW (2)
4. WIRE (2)
5. HOUSING
6. MACHINE SCREW
7. HEX NUT

TA 074773

5-53. PORTABLE WORK LAMP BULB REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Bulb (2).	Hold in place and install wires (4).	
6. Two screws (3).	Tighten.	
7. Bulb (2).	Install in housing (5).	
8. Retainer ring (1).	Install on housing (5).	
9. Machine screw (6) and hex nut (7).	Install and tighten.	
C. OPERATIONAL CHECK.		
10. Lamp.	Plug into outside cab receptacle and flip switch to ON position.	Lamp should now be lit.


1
2
3
4
5
6
7
LEGEND:
1. RETAINER
2. BULB
3. SCREW (2)
4. WIRE (2)
5. HOUSING
6. MACHINE SCREW
7. HEX NUT
TA 074774

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EXTERIOR LIGHTING.

5-54. PORTABLE WORK LAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Disassembly.	(10)
b. Assembly.	(10)
c. Operational Check.	(10)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-53A.	Bulb Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

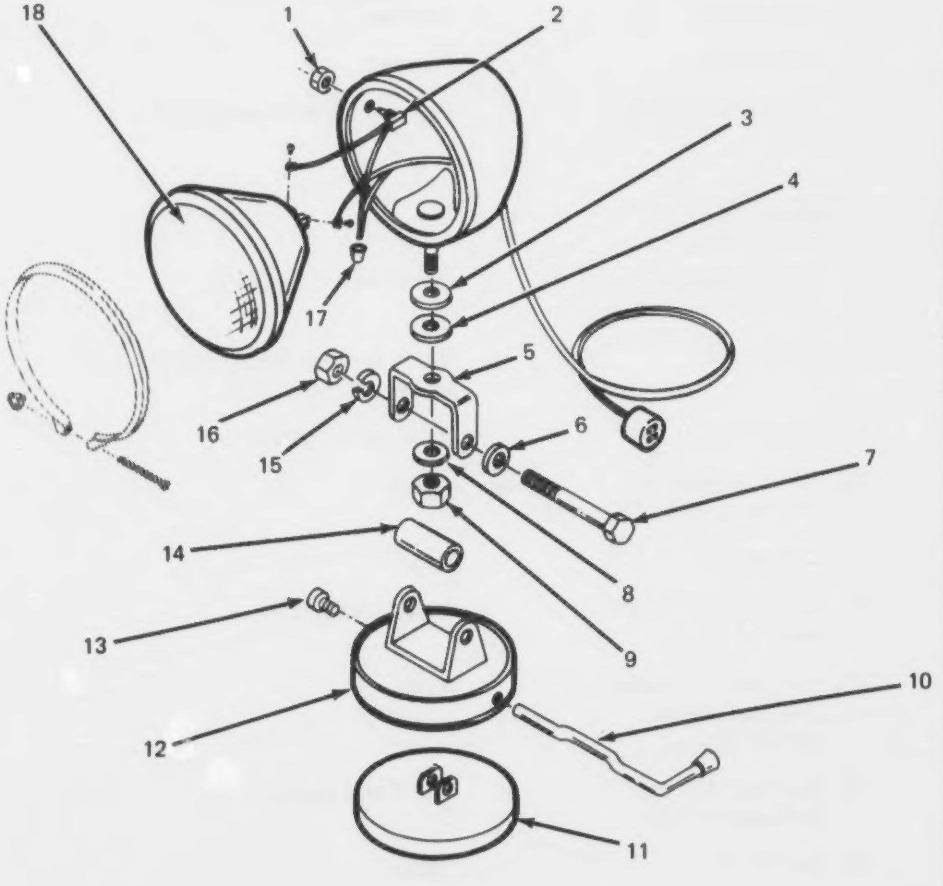
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-54. PORTABLE WORK LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY.		
1. Wire nut (17).	Remove.	
2. Lock nut (1)	Remove.	
3. Switch (2).	Remove.	
4. Hex nut (16) and lockwasher (15).	Remove.	



LEGEND:

1. LOCK NUT
2. SWITCH
3. FLATWASHER
4. PLASTIC WASHER
5. BRACKET
6. PLASTIC WASHER
7. HEX BOLT
8. LOCKWASHER
9. HEX NUT
10. LEVER
11. RUBBER SUCTION CUP
12. HOUSING
13. SCREW
14. SPACER
15. LOCKWASHER
16. HEX NUT
17. WIRE NUT
18. BULB

TA 074775

EXTERIOR LIGHTING.

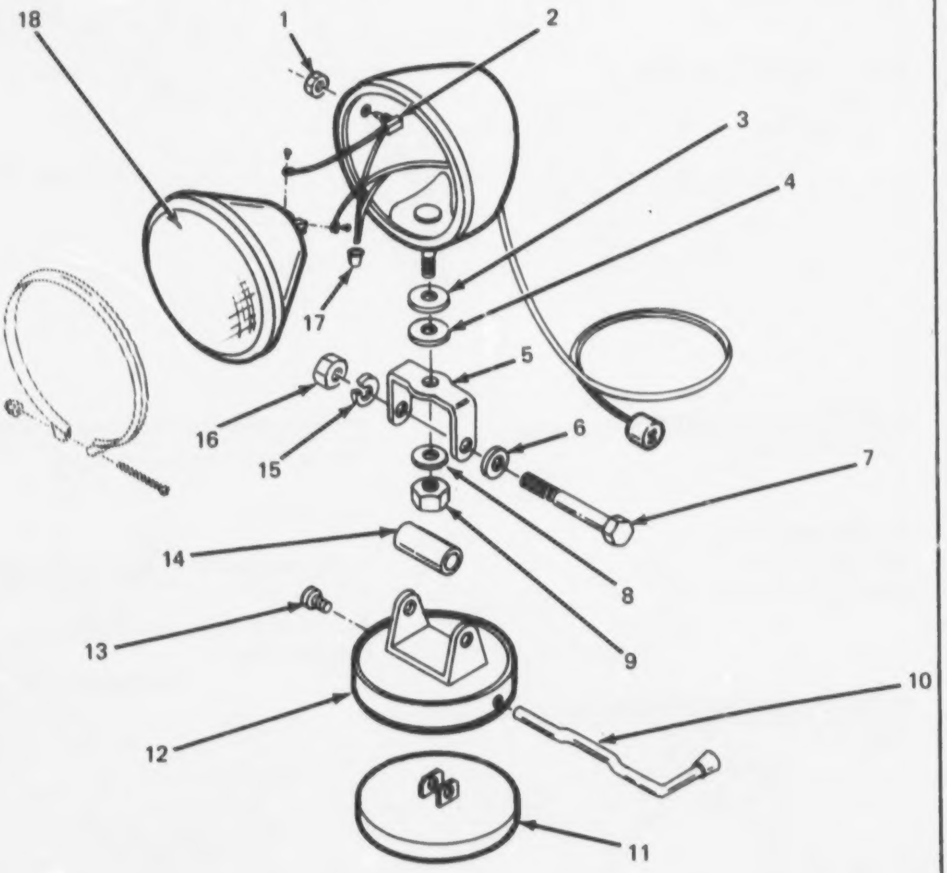
5-54. PORTABLE WORK LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DISASSEMBLY (Continued).		
5. Hex bolt (7), plastic washer (6) and spacer (14).	Remove.	
6. Hex nut (9) and lockwasher (8).	Remove.	
7. Bracket (5), plastic washer (4) and flat washer (3).	Remove.	
8. Screw (13).	Remove.	
9. Lever (10).	Remove.	
10. Rubber suction cup (11).	Remove from housing (12).	
B. ASSEMBLY.		
11. Rubber suction cup (11).	Install in housing (12).	
12. Lever (10).	Insert through housing (12) and suction cup (11).	
13. Screw (13).	Install and tighten.	
14. Plastic washer (4) and flat washer (3).	Install.	
15. Bracket (5).	Install.	
16. Lockwasher (8) and hex nut (9).	Install and tighten.	
17. Hex bolt (7), spacer (14) and plastic washer (6).	Install.	
18. Hex nut (16) and lockwasher (15).	Install and tighten.	
19. Switch (2).	Install.	
20. Locknut (1).	Install and tighten.	

EXTERIOR LIGHTING.

5-54. PORTABLE WORK LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. ASSEMBLY (Continued).		
21. Wire nut (17).	Twist one wire from switch and one wire from supply used together and install.	
22. Bulb (18).	Install	Refer to para 5-53.
C. OPERATIONAL CHECK.		
23. Lamp Assembly	Plug into outside cab receptacle and flip switch to ON position.	Lamp should now be lit.



LEGEND:

1. LOCK NUT
2. SWITCH
3. FLATWASHER
4. PLASTIC WASHER
5. BRACKET
6. PLASTIC WASHER
7. HEX BOLT
8. LOCKWASHER
9. HEX NUT
10. LEVER
11. RUBBER SUCTION CUP
12. HOUSING
13. SCREW
14. SPACER
15. LOCKWASHER
16. HEX NUT
17. WIRE NUT
18. BULB

TA 074776

EXTERIOR LIGHTING.

5-55. TRAILER LAMP CONNECTOR MAINTENANCE (12 AND 24 VOLT).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal (24 Volt Connector). (10)
b. Removal (12 Volt Connector). (10)
c. Inspection (12 Volt and 24 Volt Connector). (10)
d. Installation (24 Volt Connector). (10)
e. Installation (12 Volt Connector). (10)
f. Test (24 Volt and 12 Volt). (5)

55 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape.
Marking Pen.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-10.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

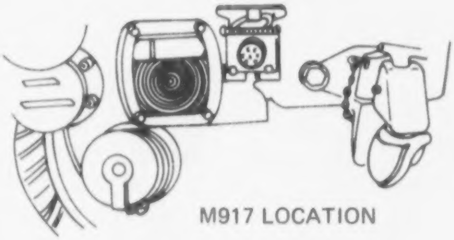
5-55. TRAILER LAMP CONNECTOR MAINTENANCE (12 VOLT AND 24 VOLT) (Continued).

NOTE

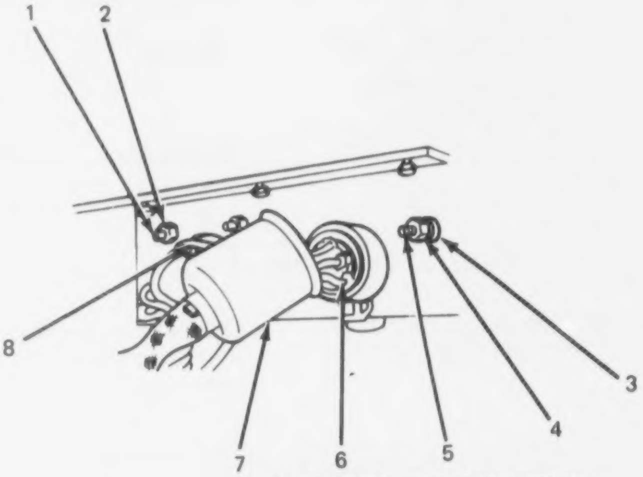
If wires are to be cut, mark each with tape and pen.

A. REMOVAL (24 VOLT CONNECTOR).

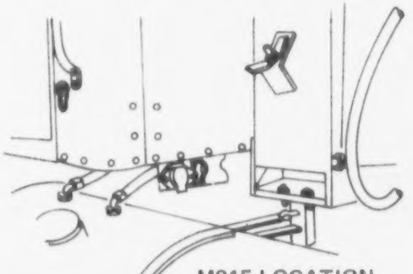
LOCATION/ITEM	ACTION	REMARKS
1. Connector assembly (8).	Unscrew from back of connector assembly (8) and pull free.	
2. Four bolts (1) and nuts (2).	Remove.	



M917 LOCATION



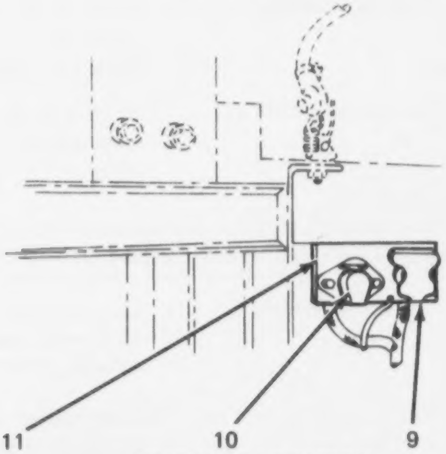
M915, M916, M920 MOUNTING



M915 LOCATION

LEGEND:

1. BOLT (4)
2. NUT (4)
3. WASHER (2)
4. NUT (2)
5. BOLT (2)
6. TERMINAL SCREW (7)
7. RUBBER BOOT
8. CONNECTOR ASSEMBLY
9. CONNECTOR ASSEMBLY
10. CONNECTOR ASSEMBLY
11. MOUNTING PLATE



M916/M920 LOCATION

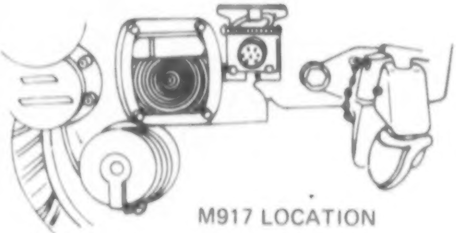
TA 074777

5-55. TRAILER LIGHTS CONNECTOR MAINTENANCE (12 AND 24 VOLT) (Continued).

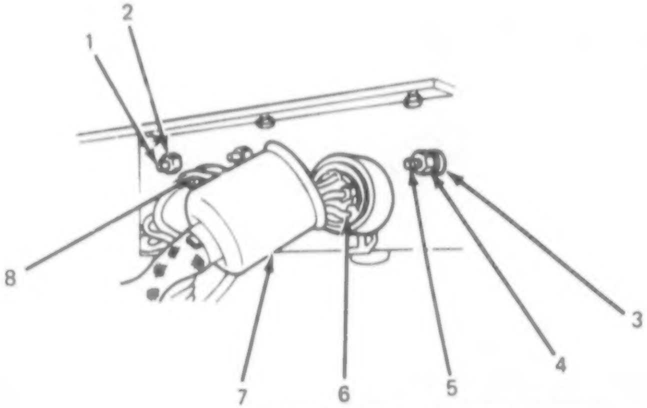
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (24 VOLT CONNECTOR) (Continued).		
3. Connector assembly (9).	Remove from mounting plate (11).	
B. REMOVAL (12 VOLT CONNECTOR).		
4. Rubber boot (7).	Twist and pull from back of connector assembly (8).	Replace if cracked.
5. Seven terminal screws (6).	Unscrew and remove wires.	Mark wires to facilitate installation.
6. Two bolts (5), washers (3), and nuts (4).	Remove.	
7. Connector assembly (10).	Remove from mounting plate (11).	
C. INSPECTION (24 VOLT AND 12 VOLT).		
8. Connectors assemblies (9) and (10).	Inspect pin receptacles (24V) and pins (12V) for corrosion.	Replace as necessary.
D. INSTALLATION (24 VOLT CONNECTOR).		
9. Connector assembly (9).	Mount into plate (11) with four bolts (1) and nuts (2). Tighten.	
10. Connector assembly (8).	Push into back of connector assembly (9) and screw on ring.	
E. INSTALLATION (12 VOLT CONNECTOR).		
11. Connector assembly (10).	Mount into mounting plate (11) with two bolts (5), washers (3), and nuts (4).Tighten.	
12. Seven terminal screws (6).	Insert seven wires as marked at removal and fasten with screws (6). Tighten.	

5-55. TRAILER LIGHTS CONNECTOR MAINTENANCE (12 AND 24 VOLT) (Continued).

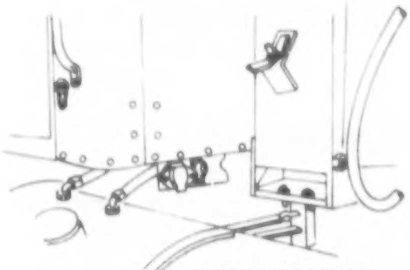
LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION (12 VOLT CONNECTOR) (Continued).		
13. Rubber boot (7).	Slide into position over terminal connections.	
F. TEST (24 VOLT AND 12 VOLT).		
14. Connector assemblies (9) and (10).	a. Hook up suitable trailer.	
	b. Activate cab controls.	1st mechanic.
	c. Check for proper functioning of all trailer lights.	2nd mechanic.



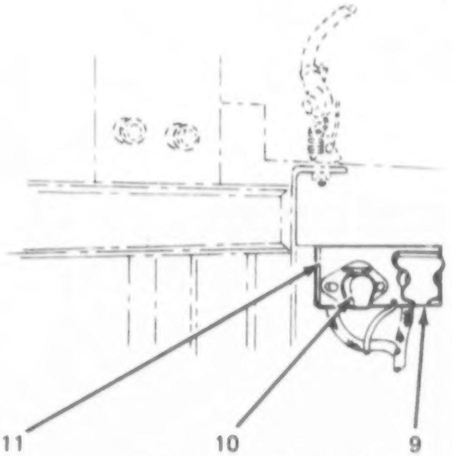
M917 LOCATION



M915, M916, M920 MOUNTING



M915 LOCATION



M916/M920 LOCATION

LEGEND:

1. BOLT (4)
2. NUT (4)
3. WASHER (2)
4. NUT (2)
5. BOLT (2)
6. TERMINAL SCREW (7)
7. RUBBER BOOT
8. CONNECTOR ASSEMBLY
9. CONNECTOR ASSEMBLY
10. CONNECTOR ASSEMBLY
11. MOUNTING PLATE

TA 074778

CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

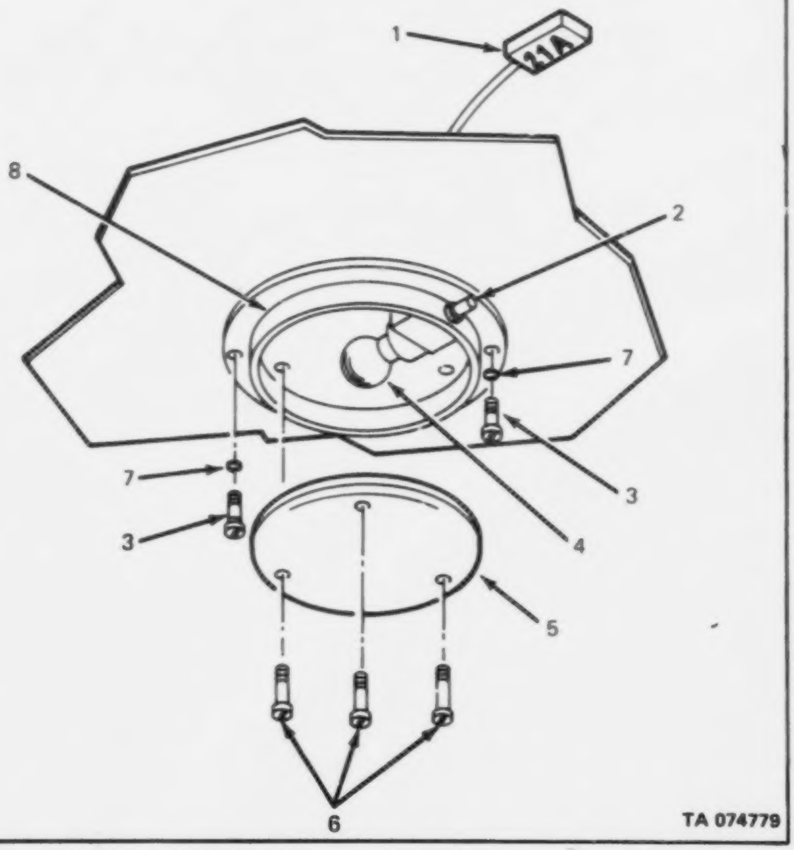
5-56. DOME LAMP MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Three screws (6).	Remove.	
2. Lens (5).	Remove.	
3. Bulb (4).	Remove.	
4. Two screws (3) and trim washers (7).	Remove.	
5. Dome lamp assembly (8).	Remove.	
6. Wire connector (1).	Disconnect.	

LEGEND:

1. WIRE CONNECTOR
2. DOME LAMP SWITCH
3. SCREW (2)
4. BULB
5. LENS
6. SCREW (3)
7. TRIM WASHER (2)
8. DOME LAMP ASSEMBLY



TA 074779

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CAB INTERIOR LIGHTING AND SWITCHES.

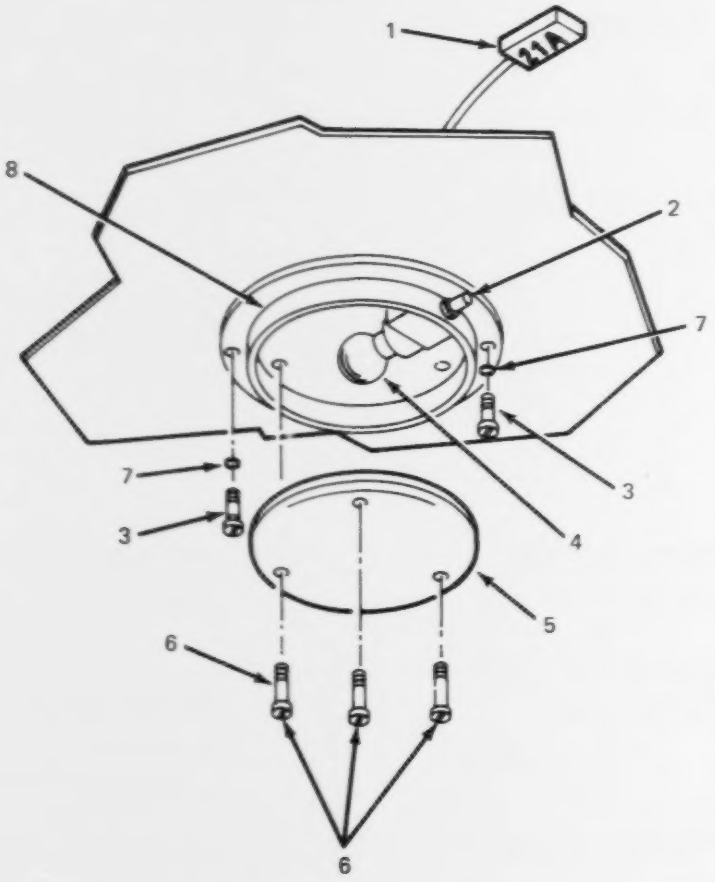
5-56. DOME LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Wire connector (1)	Reconnect.	
8. Dome lamp assembly (8).	Aline and install.	
9. Two trim washers (7) and screws (3).	Install and tighten.	
10. Bulb (4).	Install and twist to tighten.	
11. Lens (5)	Aline and install.	
12. Three screws (6).	Install and tighten.	
C. OPERATIONAL CHECK.		
13. DOME LAMP switch (2).	Press ON and OFF. Verify that lamp comes ON and goes OFF.	

CAB INTERIOR LIGHTING AND SWITCHES.

5-56. DOME LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. WIRE CONNECTOR
2. DOME LAMP SWITCH
3. SCREW (2)
4. BULB
5. LENS
6. SCREW (3)
7. TRIM WASHER (2)
8. DOME LAMP ASSEMBLY

TA 074780

CAB INTERIOR LIGHTING AND SWITCHES

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
c. Operational Check.	(2)
	22 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-8.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

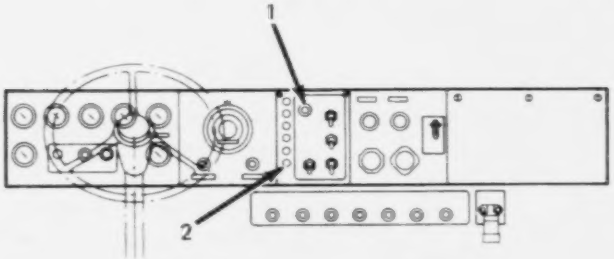
Engine OFF.
Transmission in Neutral.
Park Brake Set.

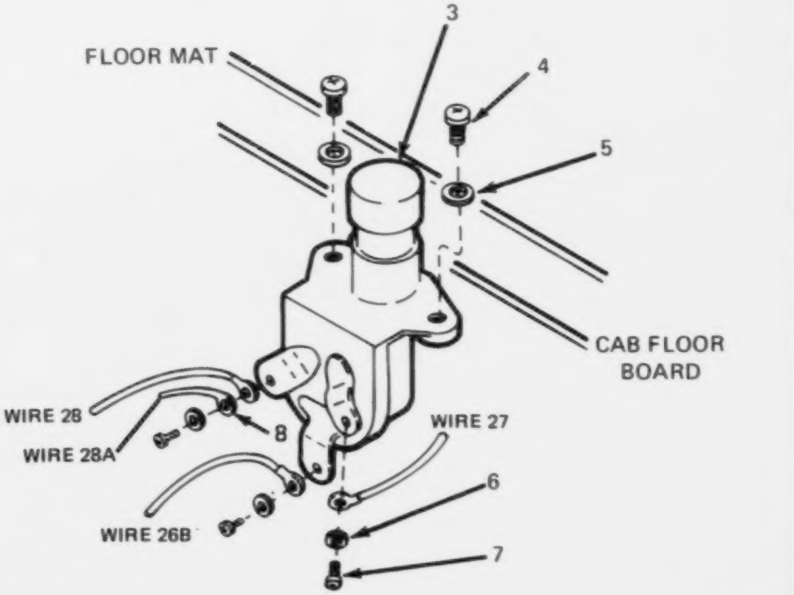
CAB INTERIOR LIGHTING AND SWITCHES.

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Floor mat.	Lift from dimmer switch (3).	
2. Two screws (4) and washers (5).	Remove.	
3. Headlamp dimmer switch (3).	Remove from under cab floor board.	
4. Three screws (7) and washers (6).	Remove.	
5. Four wires (8).	Remove.	




3
FLOOR MAT
4
5
CAB FLOOR BOARD
WIRE 28
WIRE 28A
8
WIRE 27
6
WIRE 26B
7

LEGEND:

1. LAMP SWITCH
2. HIGH BEAM INDICATOR LAMP
3. HEADLAMP DIMMER SWITCH
4. SCREW (2)
5. WASHER (2)
6. WASHER (3)
7. SCREW (3)
8. WIRE (4)

TA 074781

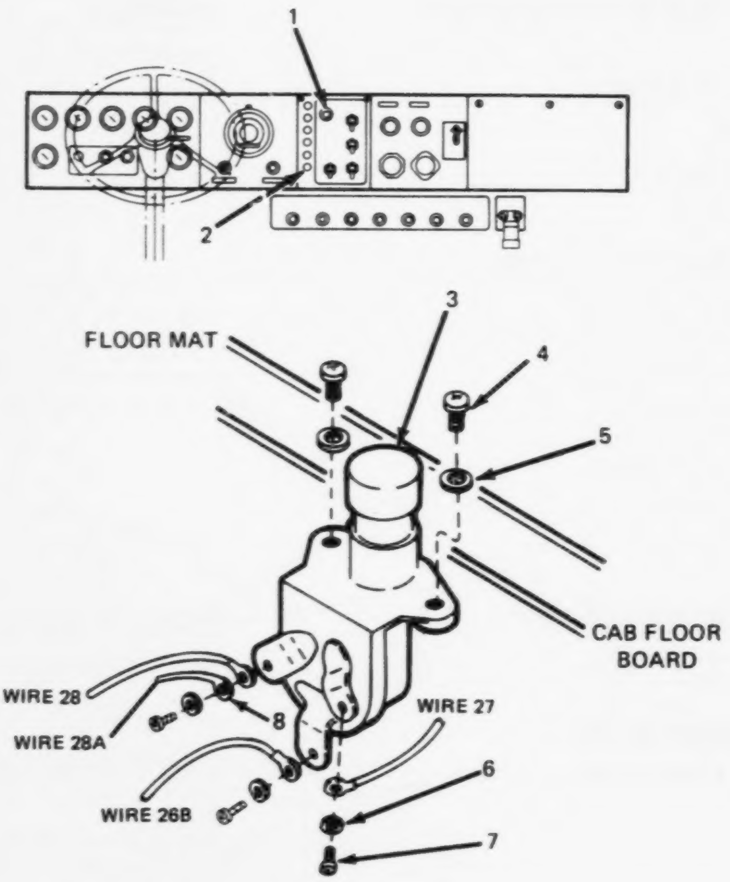
CAB INTERIOR LIGHTING AND SWITCHES.

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
6. Four wires (8).	Install on dimmer switch (3) according to figure.	
7. Three washers (6) and screws (7).	Install and tighten.	
8. Headlamps dimmer switch (3).	Install into cab floor board.	
9. Two washers (5) and screws (4).	Install and tighten.	
10. Floor mat.	Replace.	
C. OPERATIONAL CHECK.		
11. LAMP switch (1).	Pull ON.	
12. HEADLAMP DIMMER switch (3).	Press down. Verify that high beam indicator lamp (2) comes ON. Press down on headlamp dimmer switch (3) again and verify that high beam indicator lamp (2) goes OUT.	

5-57. HEADLAMP DIMMER SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
FLOOR MAT
4
5
CAB FLOOR BOARD
WIRE 28
WIRE 28A
8
WIRE 27
6
WIRE 26B
7

LEGEND:

1. LAMP SWITCH
2. HIGH BEAM INDICATOR LAMP
3. HEADLAMP DIMMER SWITCH
4. SCREW (2)
5. WASHER (2)
6. WASHER (3)
7. SCREW (3)
8. WIRE (4)

TA 074782

CAB INTERIOR LIGHTING AND SWITCHES.

5-58. TURN SIGNAL CONTROL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(7)
b. Installation.	(7)
c. Operational Check.	(1)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-11.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

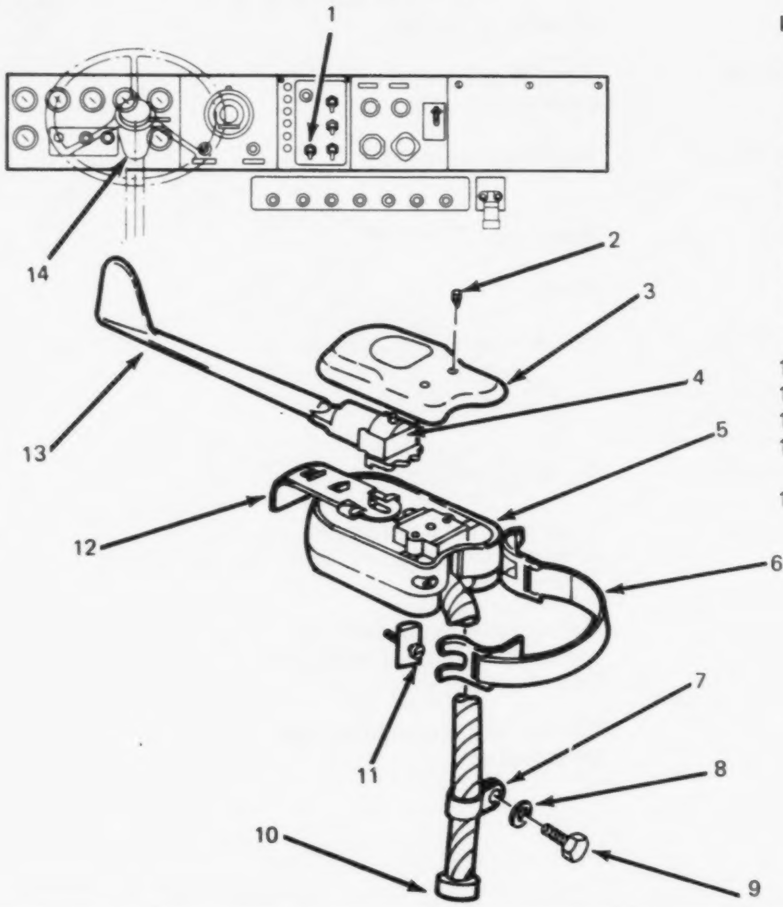
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (11) and strap (6).	Remove.	
2. Two screws (2).	Remove.	
3. Cover (3).	Remove.	
4. Handle (13) with bulb (4).	Remove.	
5. Flare tab (12).	Remove.	
6. Connector (10).	Disconnect.	



LEGEND:

1. OPERATION SWITCH
2. SCREW (2)
3. COVER
4. BULB
5. TURN SIGNAL CONTROL
6. STRAP
7. CABLE CLAMP
8. WASHER
9. BOLT
10. CONNECTOR
11. SCREW (2)
12. FLARE TAB
13. DIRECTIONAL SIGNAL HANDLE
14. STEERING COLUMN

TA 074783

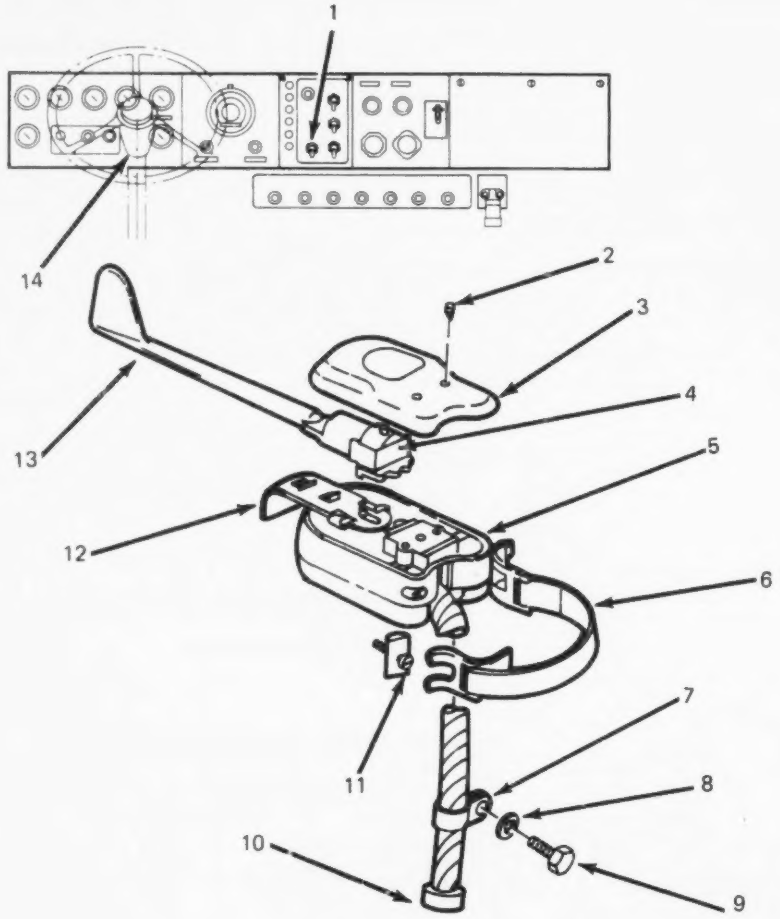
CAB INTERIOR LIGHTING AND SWITCHES.

5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Bolt (9) and washer (8).	Remove from cable clamp (7).	
8. Turn signal control (5).	Remove from steering column (14).	
B. INSTALLATION.		
9. Flare tab (12).	Place over pin and press down.	
10. Handle (13) with bulb (4).	Install and twist to tighten.	
11. Cover (3).	Install.	
12. Two screws (2).	Install and tighten.	
13. Turn signal control (5).	Aline and install on steering column (14).	
14. Strap (6) and two screws (11).	Replace and tighten.	
15. Connector (10).	Reconnect.	
16. Cable clamp (7).	Aline.	
17. Washer (8) and bolt (9).	Install and tighten.	
C. OPERATIONAL CHECK.		
18. OPERATION switch (1).	Set to Normal.	
19. Directional signal handle (13).	Place in down position and observe that left green lamp flashes. Place handle in up position and observe that right green lamp flashes.	
20. Flare tab (12).	Pull tab and observe that red lamp flashes.	

5-58. TURN SIGNAL CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. OPERATION SWITCH
2. SCREW (2)
3. COVER
4. BULB
5. TURN SIGNAL CONTROL
6. STRAP
7. CABLE CLAMP
8. WASHER
9. BOLT
10. CONNECTOR
11. SCREW (2)
12. FLARE TAB
13. DIRECTIONAL SIGNAL HANDLE
14. STEERING COLUMN

TA 074784

PANEL MOUNTED INSTRUMENTS

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(5)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission In Neutral.

PANEL MOUNTED INSTRUMENTS.

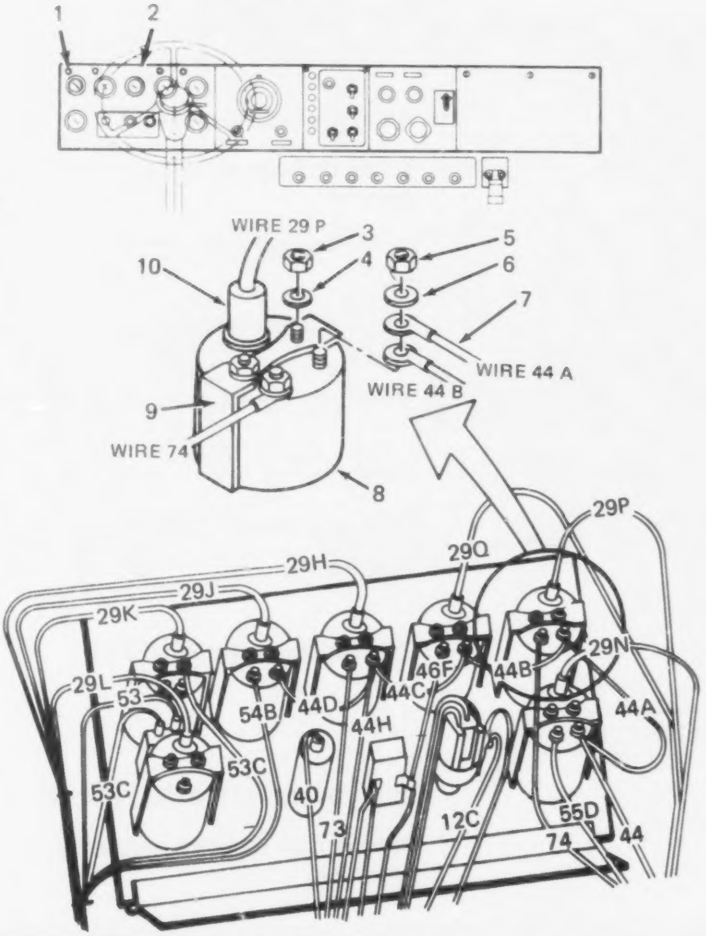
5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).

NOTE

The gages covered in the following procedures are identical as far as removal and installation; therefore, only one is covered - the FUEL gage.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	


1
2
WIRE 29 P
3
4
5
6
7
10
WIRE 44 A
WIRE 44 B
9
WIRE 74
8
29P
29Q
29H
29J
29K
29N
29L
53
46F
44B
44C
44D
54B
44H
44A
53C
53C
40
73
12C
55D
74
44

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. NUT (2)
4. WASHER (2)
5. NUT (2)
6. WASHER (2)
7. WIRE (3)
8. FUEL GAGE
9. BRACKET
10. ILLUMINATING BULB

TA 074785

PANEL MOUNTED INSTRUMENTS.

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Illuminating bulb (10).	Remove.	
4. Two nuts (5) and washers (6).	Remove.	
5. Three wires (7) .	Remove.	
6. Two nuts (3) and washers (4).	Remove.	
7. Bracket (9).	Remove.	
8. FUEL gage (8).	Remove from instrument panel.	
B. INSTALLATION.		
9. FUEL gage (8).	Aline and insert in panel.	
10. Bracket (9).	Install on back of FUEL gage (8).	
11. Two washers (4) and nuts (3).	Install and tighten.	
12. Three wires (7).	Install according to figure.	
13. Two washers (6) and nuts (5).	Install and tighten.	
14. Illuminating bulb (10).	Install.	
15. Hinged instrument panel (2).	Raise into place.	
16. Four quarter-turn screws (1).	Tighten.	
17. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
18. Engine.	Start up (see TM 9-2320-273-10).	
19. Gages.	Observe gage replaced and verify operation.	

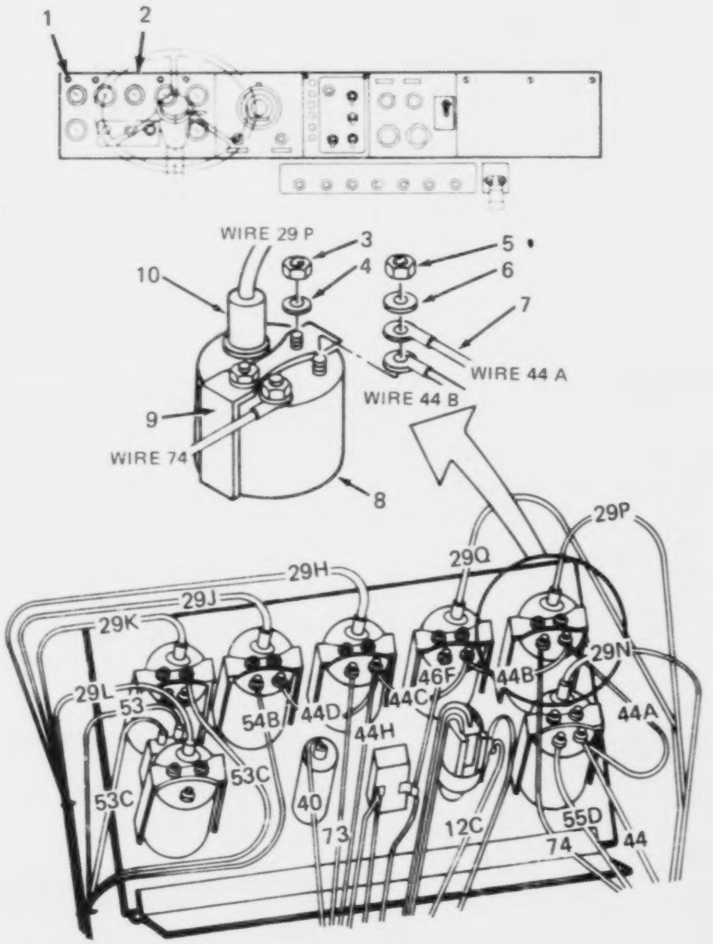
PANEL MOUNTED INSTRUMENTS.

5-59. ELECTRICAL INSTRUMENTS MAINTENANCE (LH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. NUT (2)
4. WASHER (2)
5. NUT (2)
6. WASHER (2)
7. WIRE (3)
8. FUEL GAGE
9. BRACKET
10. ILLUMINATING BULB


1
2
WIRE 29 P
3
4
5
6
7
10
WIRE 44 A
WIRE 44 B
9
WIRE 74
8
29P
29Q
29H
29J
29K
29L
53
54B
44D
44C
46F
44B
29N
44A
44H
53C
53C
40
73
12C
55D
74
44

TA 074786

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

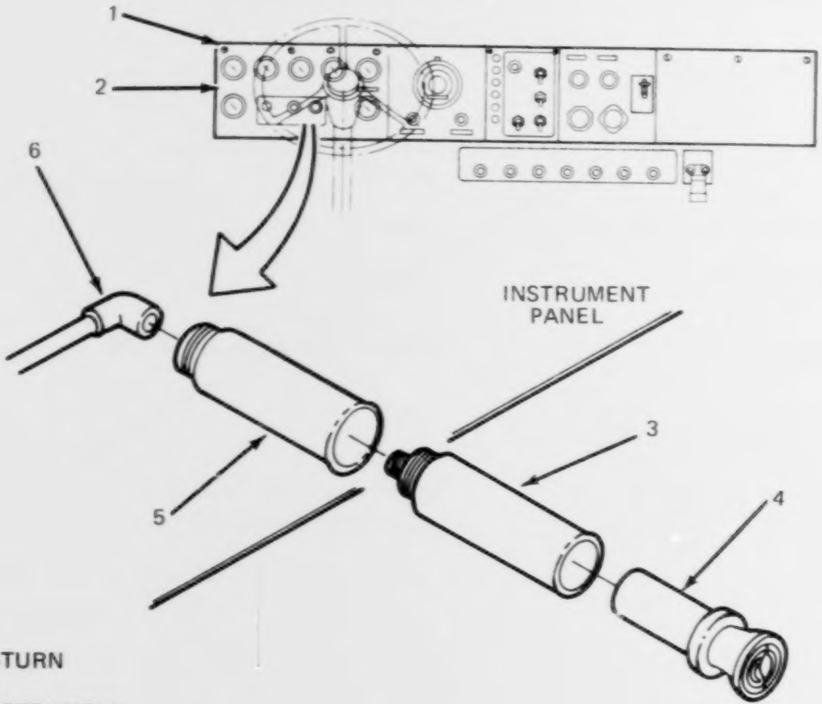
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Wire cap connector (6).	Remove.	



LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. CIGAR LIGHTER UNIT
4. HEATING UNIT AND BUTTON ASSEMBLY
5. CIGAR LIGHTER CASING
6. WIRE CAP CONNECTOR

TA 074787

PANEL MOUNTED INSTRUMENTS.

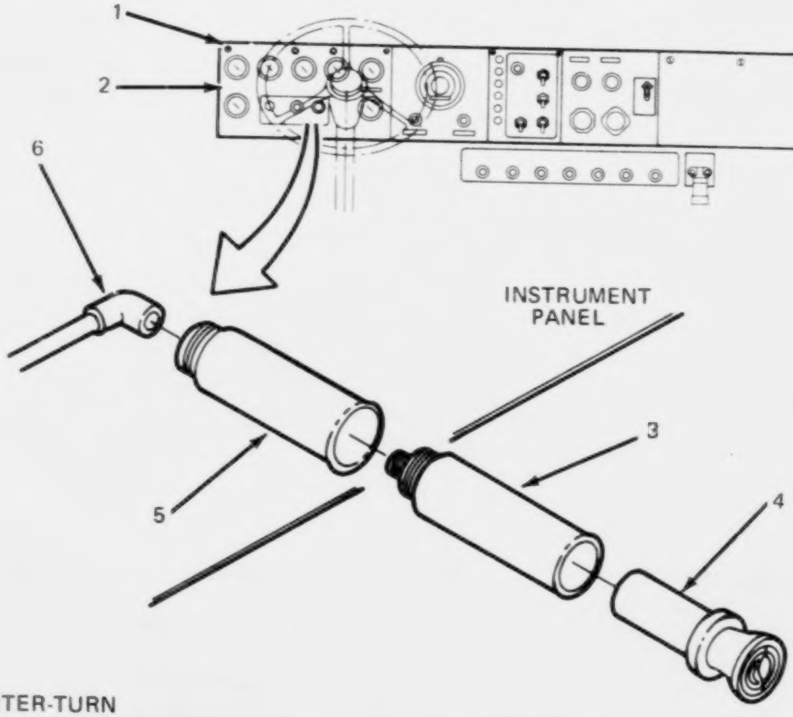
5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued):		
4. Heating unit and button assembly (4).	Remove.	
5. Cigar lighter casing (5).	Unscrew from cigar lighter unit (3).	
6. Cigar lighter unit (3).	Remove from instrument panel.	
B. INSTALLATION.		
7. Cigar lighter unit (3).	Install in instrument panel.	
8. Cigar lighter casing (5).	Install on cigar lighter unit (3) and tighten.	
9. Wire cap connector (6).	Install on cigar lighter unit (3).	
10. Hinged instrument panel (2).	Raise into place.	
11. Four quarter-turn screws (1).	Tighten.	
12. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
13. Heating unit and button assembly (4).	Insert and press. Verify that element gets hot.	

PANEL MOUNTED INSTRUMENTS.

5-60. CIGAR LIGHTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. CIGAR LIGHTER UNIT
4. HEATING UNIT AND BUTTON ASSEMBLY
5. CIGAR LIGHTER CASING
6. WIRE CAP CONNECTOR

TA 074788

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(1)
b. Installation.	(1)
c. Operational Check.	(1)
	3 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-6.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

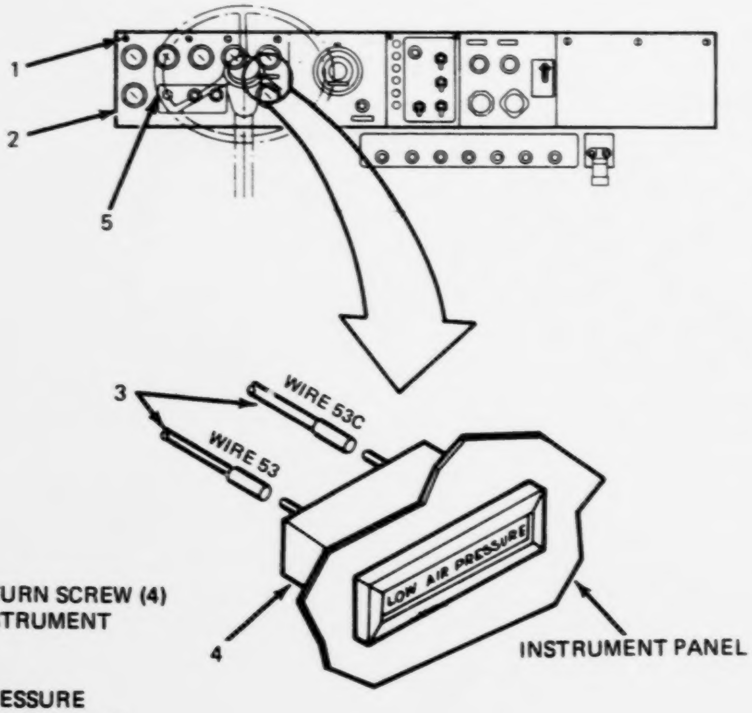
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in NEUTRAL.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower.	
3. Two wires (3)	Remove.	
4. LOW AIR PRESSURE indicator lamp unit (4).	Remove from instrument panel.	


1
2
5
3
WIRE 53C
WIRE 53
LOW AIR PRESSURE
4
INSTRUMENT PANEL

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. LOW AIR PRESSURE INDICATOR LAMP UNIT
5. ENGINE RUN SWITCH

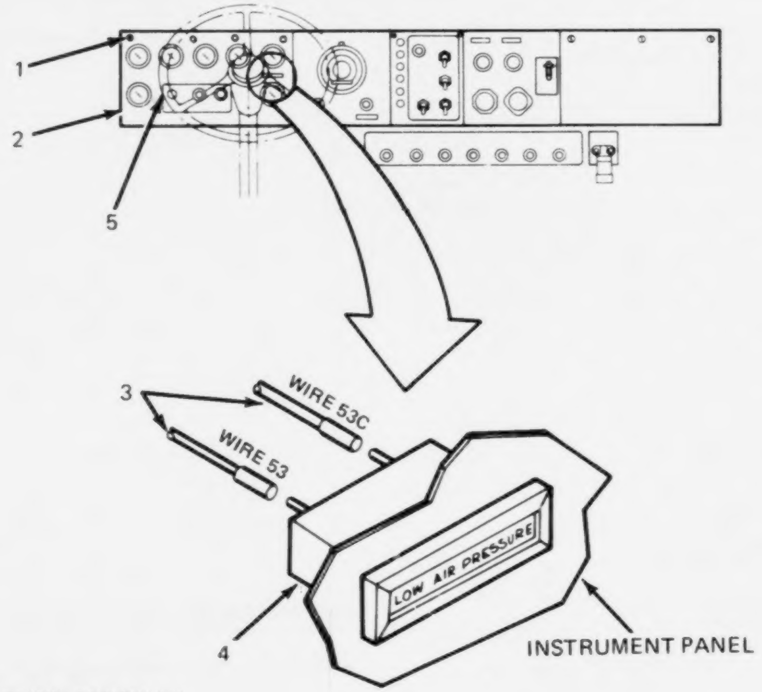
TA 074789

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. LOW AIR PRESSURE indicator lamp unit (4).	Aline and press into instrument panel.	
6. Two wires (3).	Connect to LOW AIR PRESSURE indicator lamp unit (4).	
7. Hinged instrument panel (2).	Raise into place.	
8. Four quarter-turn screws (1).	Tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Air pressure supply reservoir.	Bleed off air pressure (see TM 9-2320-273-10).	
11. ENGINE RUN switch (5).	Turn on. Verify that LOW AIR PRESSURE lamp comes ON.	

5-61. LOW AIR PRESSURE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
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WIRE 53C
WIRE 53
LOW AIR PRESSURE
4
INSTRUMENT PANEL

LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED INSTRUMENT PANEL
3. WIRE (2)
4. LOW AIR PRESSURE INDICATOR LAMP UNIT
5. ENGINE RUN SWITCH

TA 074790

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Installation.	(30)
c. Operational Check.	(5)
	65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

1. OPERATION Switch-All.
2. ENGINE RETARDER Switch-All.
3. LAMP Switch-All.
4. BACKUP ALARM Switch - M916 Thru M920.
5. WORK LAMPS Switch - M916 and M920.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Masking tape.
Marking pen.
Tie Wrap, MS-3367-2-0 (96906).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-4, 5-6, 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

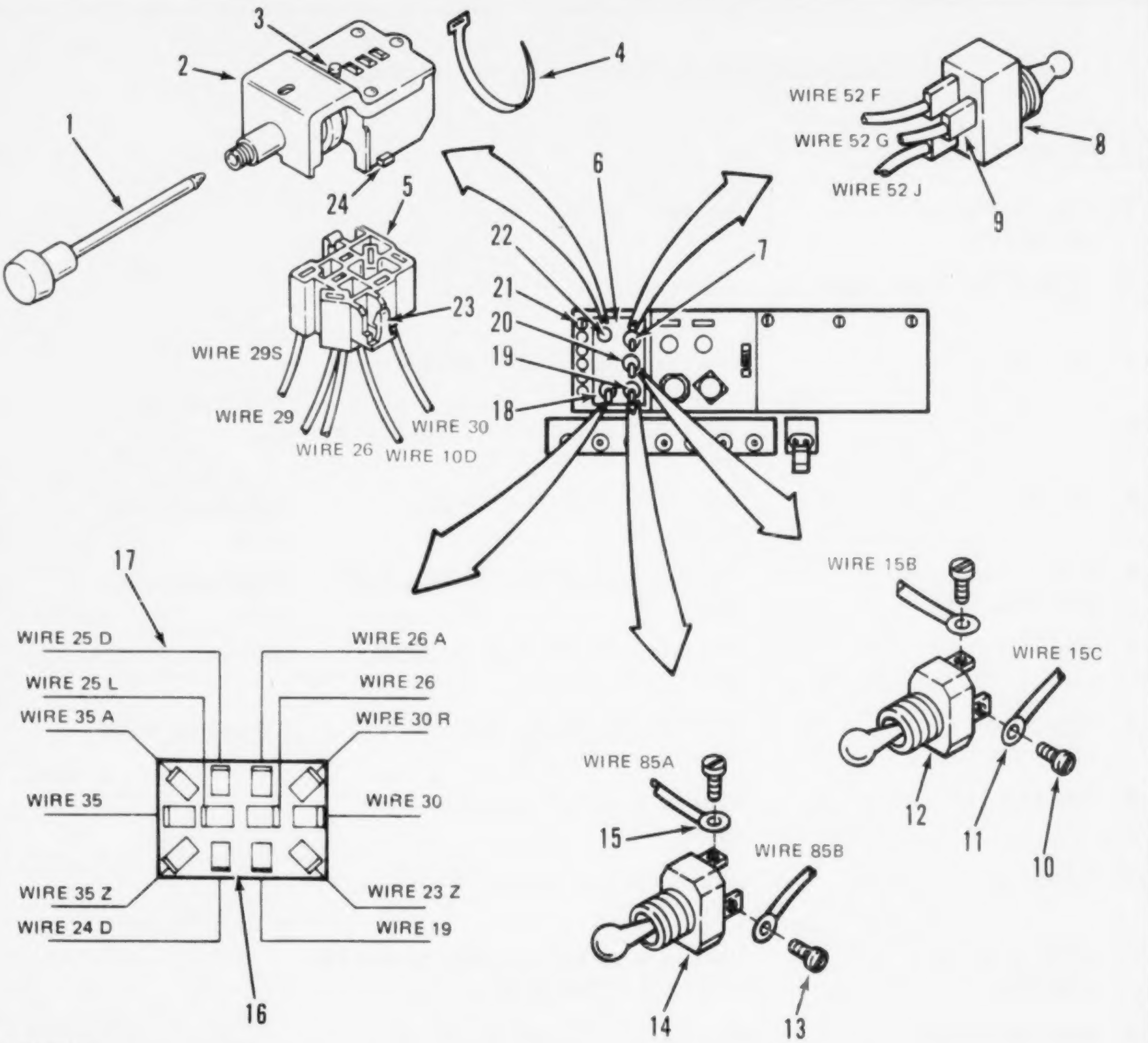
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS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21
22
23
24
WIRE 52 F
WIRE 52 G
WIRE 52 J
WIRE 29S
WIRE 29
WIRE 26
WIRE 30
WIRE 10D
WIRE 15B
WIRE 15C
WIRE 85A
WIRE 85B
WIRE 25 D
WIRE 25 L
WIRE 35 A
WIRE 35
WIRE 35 Z
WIRE 24 D
WIRE 26 A
WIRE 26
WIRE 30 R
WIRE 30
WIRE 23 Z
WIRE 19

LEGEND:

1. KNOB AND SHAFT ASSEMBLY
2. LAMP SWITCH
3. RELEASE BUTTON
4. TIE WRAP
5. LAMP SWITCH CONNECTOR
6. HINGED INSTRUMENT PANEL
7. HEX NUT
8. ENGINE RETARDER SWITCH
9. WIRE (3)
10. SCREW (2)
11. WIRE (2)
12. WORK LAMPS SWITCH
13. SCREW (2)
14. BACKUP ALARM SWITCH
15. WIRE (2)
16. OPERATION SWITCH
17. WIRE (12)
18. HEX NUT
19. HEX NUT
20. HEX NUT
21. QUARTER-TURN SCREW (2)
22. KNURLED NUT
23. MOLDED CLIP (2)
24. TAB (2)

TA076517

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

NOTE

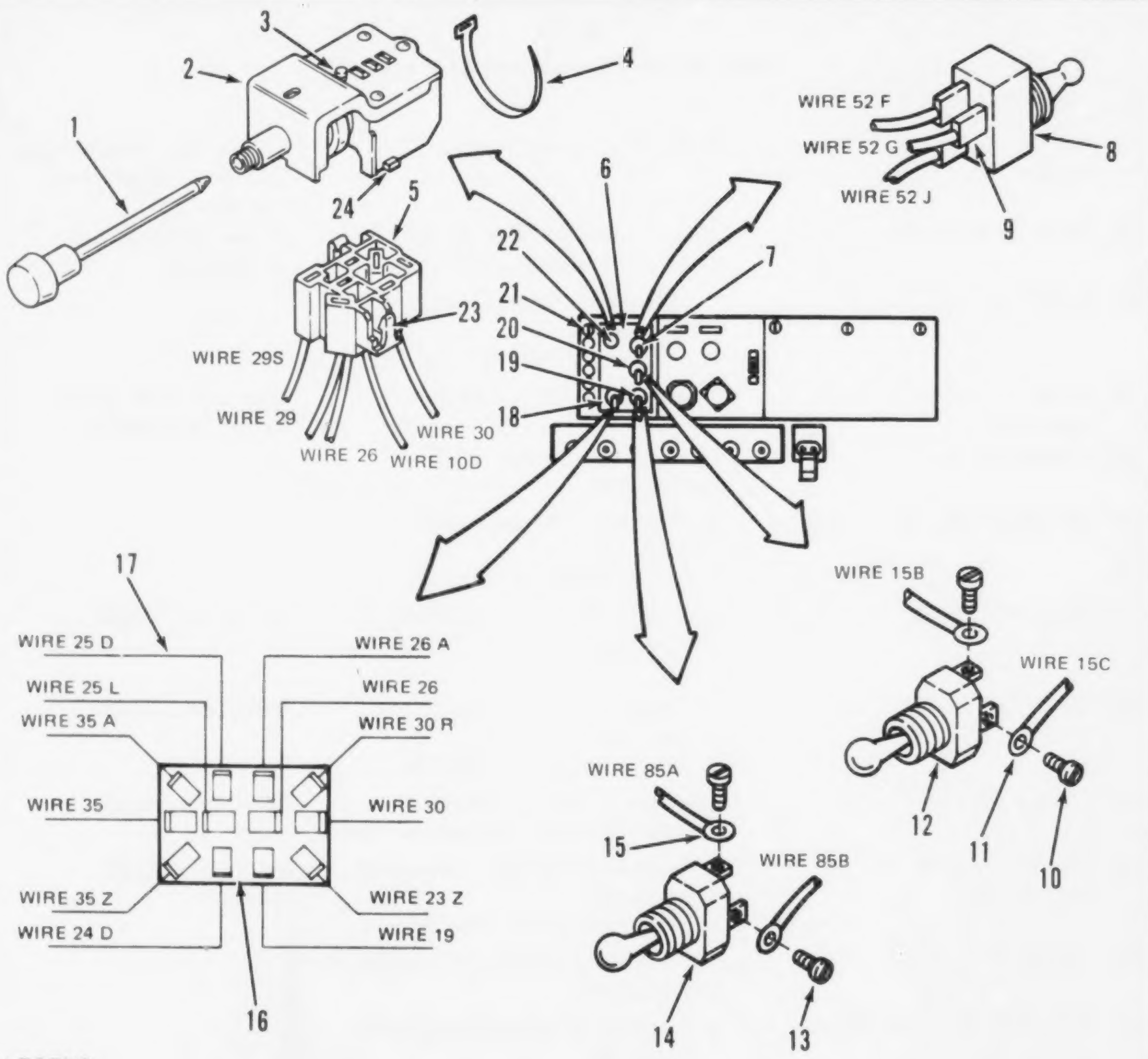
Tag all wires prior to disconnecting for ease of correct installation.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two quarter-turn screws (21).	Loosen.	
2. Hinged instrument panel (6).	Lower.	
3. Hex Nut (7).	Remove from ENGINE RETARDER switch (8).	
4. Three wires (9).	Disconnect and remove ENGINE RETARDER Switch (8).	
5. Hex nut (20).	Remove from WORK LAMPS switch (12).	M916 and M920 only.
6. Two screws (10) and wires (11).	Unscrew and remove WORK LAMPS switch (12).	M916 and M920 only.
7. Hex Nut (19).	Remove from BACKUP ALARM switch (14).	M916 thru M920.
8. Two screws (13) and wires (15).	Unscrew and remove BACKUP ALARM switch (14).	M916 thru M920.
9. Hex Nut (18).	Remove from OPERATION switch (16).	
10. Twelve wires (17).	Disconnect and remove OPERATION switch (16).	
11. Knob and shaft assembly (1).	Remove by pressing release button (3) on top of LAMP switch (2).	
12. Knurled nut (22).	Remove from LAMP switch (2).	
13. Tie wrap (4).	Cut and remove from around LAMP switch (2) and LAMP switch connector (5).	If used.
14. Lamp switch connector (5).	a. Disconnect by pulling outward slightly on two molded clips (23). b. Remove LAMP switch (2).	

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS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WIRE 52 F
WIRE 52 G
WIRE 52 J
WIRE 29S
WIRE 29
WIRE 26
WIRE 30
WIRE 10D
WIRE 15B
WIRE 15C
WIRE 85A
WIRE 85B
WIRE 25 D
WIRE 25 L
WIRE 35 A
WIRE 35
WIRE 35 Z
WIRE 24 D
WIRE 26 A
WIRE 26
WIRE 30 R
WIRE 30
WIRE 23 Z
WIRE 19

LEGEND:

1. KNOB AND SHAFT ASSEMBLY
2. LAMP SWITCH
3. RELEASE BUTTON
4. TIE WRAP
5. LAMP SWITCH CONNECTOR
6. HINGED INSTRUMENT PANEL
7. HEX NUT
8. ENGINE RETARDER SWITCH
9. WIRE (3)
10. SCREW (2)
11. WIRE (2)
12. WORK LAMPS SWITCH
13. SCREW (2)
14. BACKUP ALARM SWITCH
15. WIRE (2)
16. OPERATION SWITCH
17. WIRE (12)
18. HEX NUT
19. HEX NUT
20. HEX NUT
21. QUARTER-TURN SCREW (2)
22. KNURLED NUT
23. MOLDED CLIP (2)
24. TAB (2)

TA076518

PANEL MOUNTED INSTRUMENTS.

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

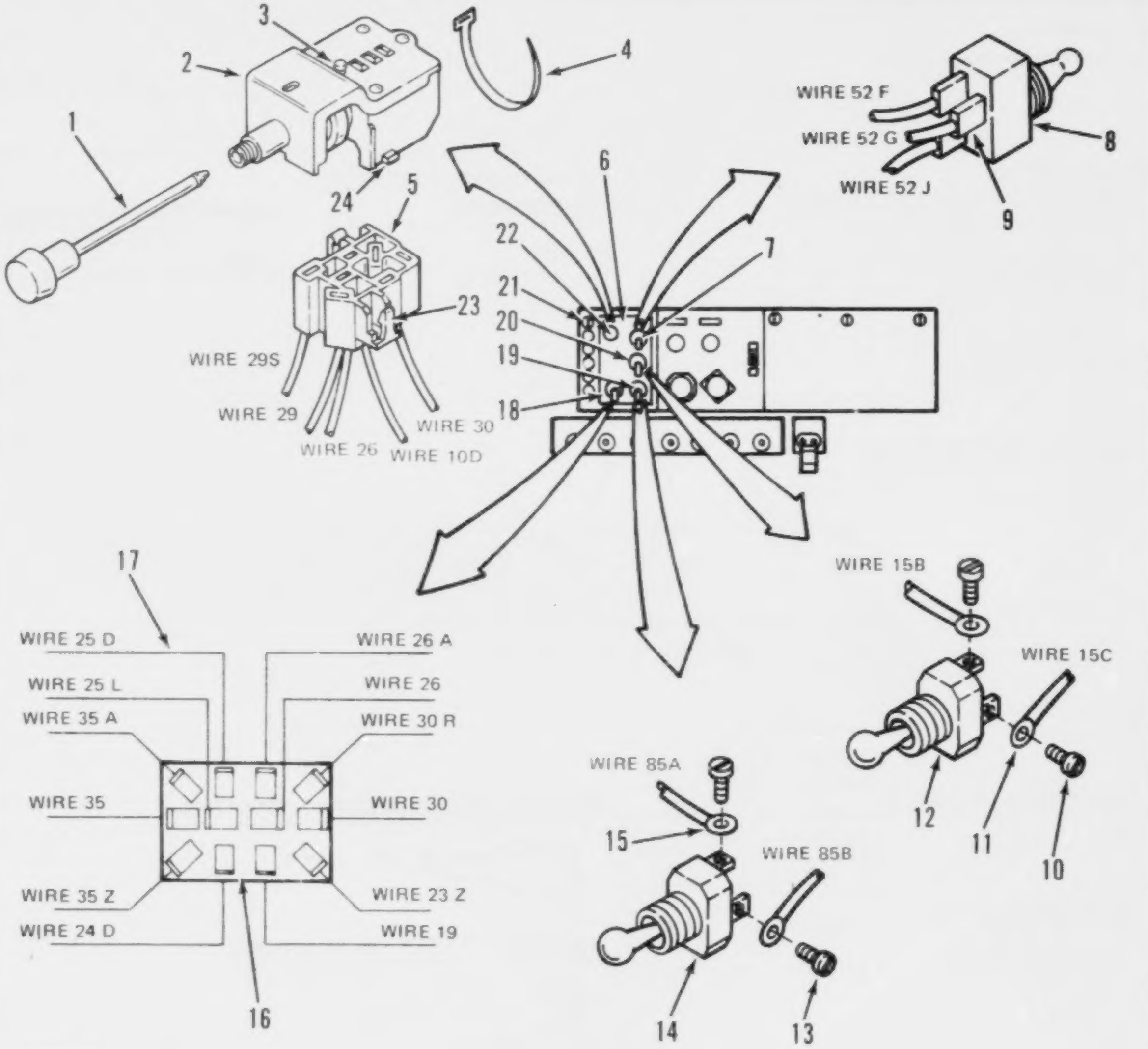
NOTE

Install all wires as you marked at removal.

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
15. LAMP switch connector (5).	Push on to LAMP switch (2).	Ensure two molded clips (23) are snapped over two tabs (24).
16. New tie wrap (4).	Install around LAMP switch (2) and LAMP switch connector (5).	If one was present at removal.
17. LAMP switch (2).	a. Position in hinged instrument panel (6). b. Secure with knurled nut (22).	
18. Knob and shaft assembly (1).	Insert shaft into LAMP switch (2).	Push in firmly until locked in position.
19. Twelve wires (17).	Connect to OPERATION switch (16).	
20. OPERATION switch (16).	a. Position in hinged instrument panel (6). b. Secure with hex nut (18).	
21. Two wires (15).	Secure to BACKUP ALARM switch (14) with two screws (13).	M916 thru M920.
22. BACKUP ALARM switch (14).	a. Position in hinged instrument panel (6). b. Secure with hex nut (19).	M916 thru M920.
23. Two wires (11).	Connect to WORK LAMPS switch (12) with two screws (10).	M916 and M920 only.
24. WORK LAMPS switch (12).	a. Position in hinged instrument panel (6). b. Secure with hex nut (20).	M916 and M920 only.
25. Three wires (9).	Connect to ENGINE RETARDER switch (8).	
26. ENGINE RETARDER switch (8).	a. Position in hinged instrument panel (6). b. Secure with hex nut (7).	
27. Hinged instrument panel (6).	Raise into position and secure with two quarter-turn screws (21).	
28. Batteries.	Connect (refer to para. 5-37B).	
C. OPERATIONAL CHECK.		
29. Switch (as required).	Check operation.	

5-62. ELECTRICAL SWITCHES MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS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19
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21
22
23
24
WIRE 52 F
WIRE 52 G
WIRE 52 J
WIRE 29S
WIRE 29
WIRE 26
WIRE 30
WIRE 10D
WIRE 15B
WIRE 15C
WIRE 85A
WIRE 85B
WIRE 25 D
WIRE 26 A
WIRE 25 L
WIRE 26
WIRE 35 A
WIRE 30 R
WIRE 35
WIRE 30
WIRE 35 Z
WIRE 23 Z
WIRE 24 D
WIRE 19

LEGEND:

1. KNOB AND SHAFT ASSEMBLY
2. LAMP SWITCH
3. RELEASE BUTTON
4. TIE WRAP
5. LAMP SWITCH CONNECTOR
6. HINGED INSTRUMENT PANEL
7. HEX NUT
8. ENGINE RETARDER SWITCH
9. WIRE (3)
10. SCREW (2)
11. WIRE (2)
12. WORK LAMPS SWITCH
13. SCREW (2)
14. BACKUP ALARM SWITCH
15. WIRE (2)
16. OPERATION SWITCH
17. WIRE (12)
18. HEX NUT
19. HEX NUT
20. HEX NUT
21. QUARTER-TURN SCREW (2)
22. KNURLED NUT
23. MOLDED CLIP (2)
24. TAB (2)

TA076519

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(3)
b. Installation.	(3)
c. Operational Check.	(3)
	9 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

1. M916 Thru M920-ALL.
2. M915 ALL (Except PTO).

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

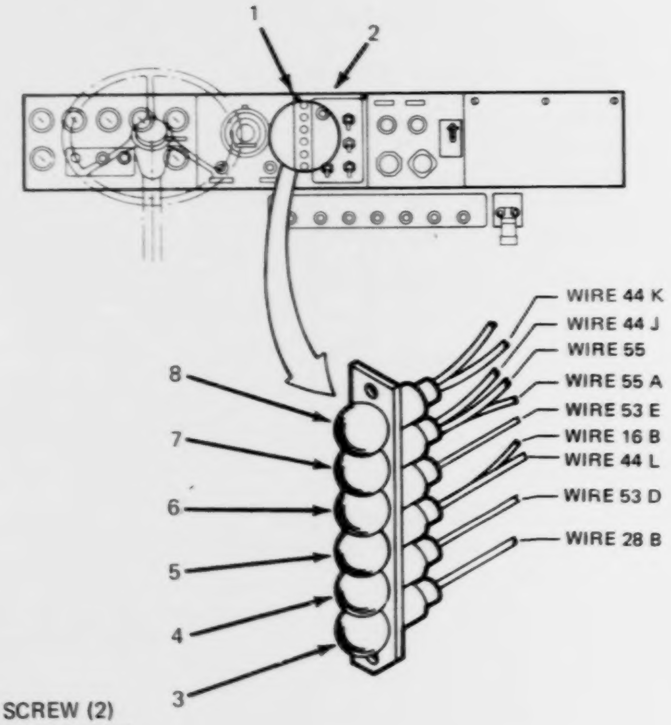
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen.	
2. Hinged instrument panel (2).	Lower hinged panel.	
3. HIGH BEAM bulb (3).	Remove.	


1
2
WIRE 44 K
WIRE 44 J
WIRE 55
8
WIRE 55 A
WIRE 53 E
WIRE 16 B
7
WIRE 44 L
6
WIRE 53 D
WIRE 28 B
5
4
3

LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED INSTRUMENT PANEL
3. HIGH BEAM BULB
4. PARK BRAKE BULB
5. PTO BULB
6. DIFF LOCK BULB
7. ENG TEMP BULB
8. ENG OIL BULB

TA 074794

PANEL MOUNTED INSTRUMENTS.

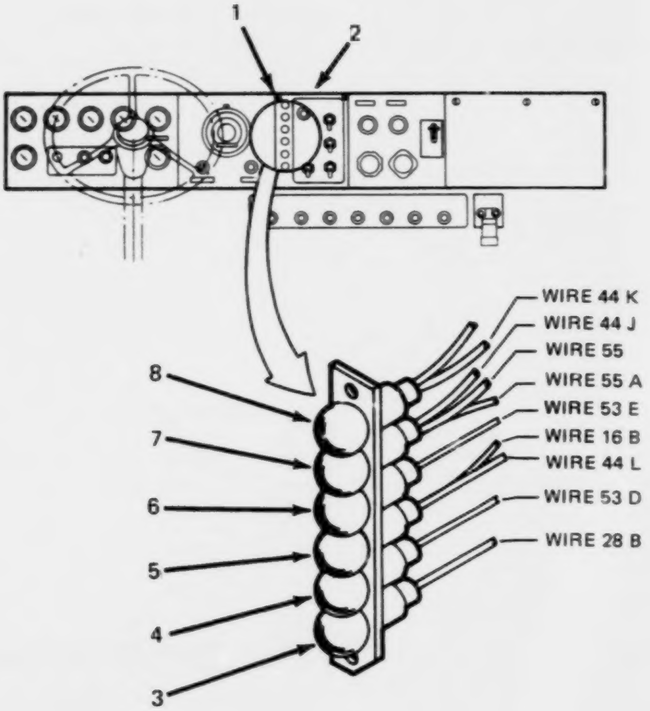
5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. PARK BRAKE bulb (4).	Remove.	
5. PTO bulb (5).	Remove.	
6. DIFF LOCK bulb (6).	Remove.	
7. ENG TEMP bulb (7).	Remove.	
8. ENG OIL bulb (8).	Remove.	
B. INSTALLATION.		
9. ENG OIL bulb (8).	Insert in holder.	
10. ENG TEMP bulb (7).	Insert in holder.	
11. DIFF LOCK bulb (6).	Insert in holder.	
12. PTO bulb (5).	Insert in holder.	
13. PARK BRAKE bulb (4).	Insert in holder.	
14. HIGH BEAM bulb (3).	Insert in holder.	
15. Hinged instrument panel (2).	Raise into place.	
16. Two quarter-turn Screws (1).	Tighten.	
C. OPERATIONAL CHECK.		
17. Switch (as required).	Turn on and verify operation of new bulb.	

PANEL MOUNTED INSTRUMENTS.

5-63. INDICATOR LAMPS MAINTENANCE (RH CLUSTER) (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
WIRE 44 K
WIRE 44 J
WIRE 55
WIRE 55 A
WIRE 53 E
WIRE 16 B
WIRE 44 L
WIRE 53 D
WIRE 28 B
8
7
6
5
4
3

LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED INSTRUMENT PANEL
3. HIGH BEAM BULB
4. PARK BRAKE BULB
5. PTO BULB
6. DIFF LOCK BULB
7. ENG TEMP BULB
8. ENG OIL BULB

TA 074795

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

ALL.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-9.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

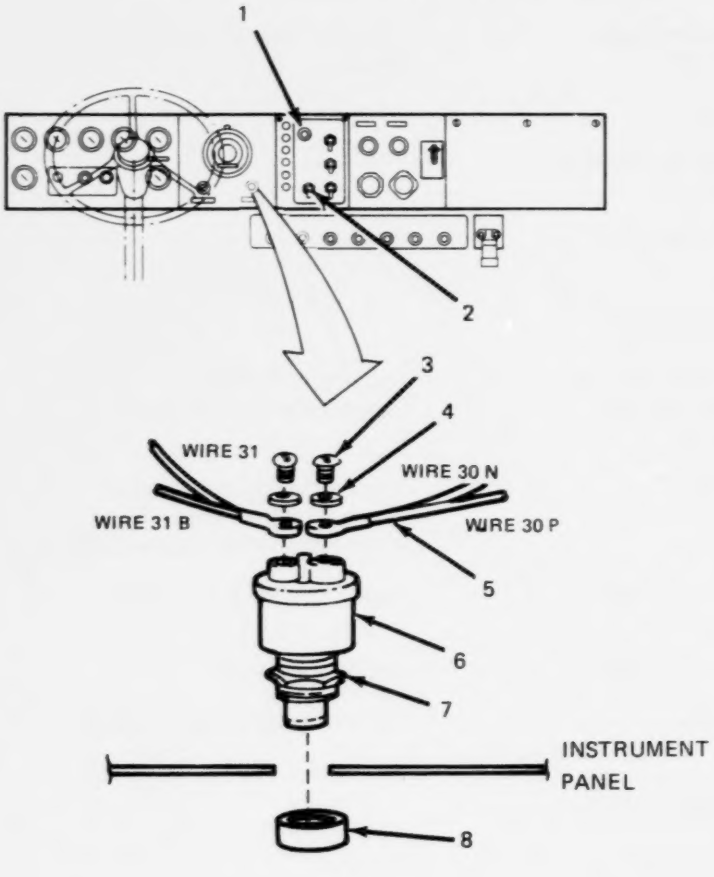
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
4
WIRE 31
WIRE 30 N
WIRE 31 B
WIRE 30 P
5
6
7
INSTRUMENT PANEL
8

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. CLEARANCE LAMPS SWITCH
7. HEX NUT
8. KNURLED NUT

TA 074796

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

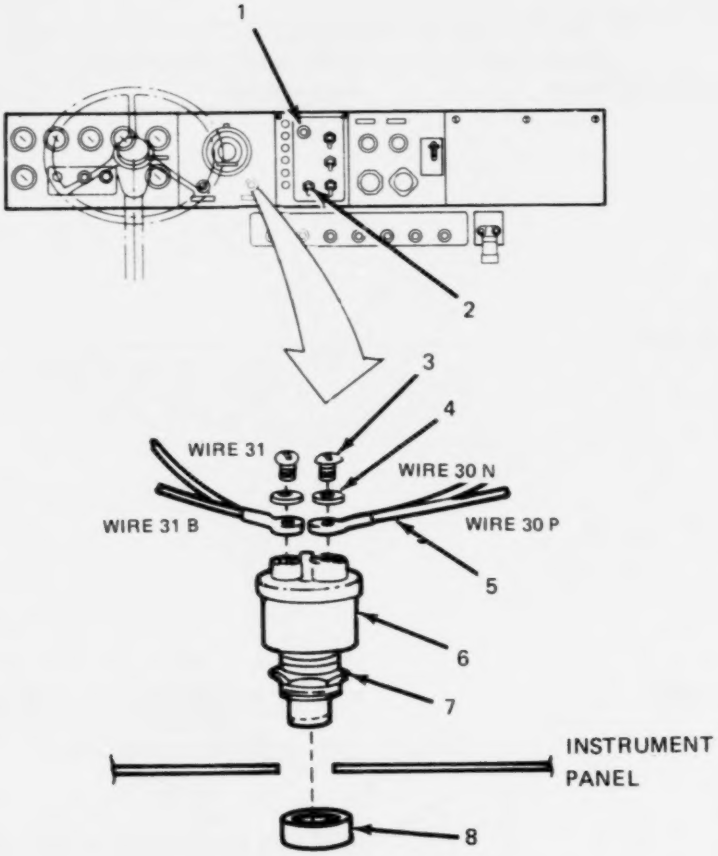
	LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.			
1.	Knurled nut (8).	Remove.	
2.	Clearance lamps switch (6).	Remove from instrument panel.	
3.	Hex nut (7).	Remove.	
4.	Two screws (3) and washers (4).	Remove.	
5.	Four wires (5).	Remove	
B. INSTALLATION.			
6.	Four wires (5), two washers (4), and screws (3).	Install and tighten on clearance lamps switch (6).	
7.	Hex nut (7).	Install and adjust to proper depth on switch (6) to allow installation of knurled nut (8).	
8.	Clearance lamps switch (6).	Install in instrument panel.	
9.	Knurled nut (8).	Install and tighten.	
10.	Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.			
11.	LAMP switch (1).	Pull ON.	
12.	OPERATION switch (2).	Set to Normal.	
13.	CLEARANCE LAMPS switch (6).	Press and release.	First mechanic.
14.	Clearance lamps.	Verify that lamps go OFF and ON.	Second mechanic.

TA 074797

PANEL MOUNTED INSTRUMENTS.

5-64. CLEARANCE LAMPS SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
4
WIRE 31
WIRE 30 N
WIRE 31 B
WIRE 30 P
5
6
7
INSTRUMENT
PANEL
8

LEGEND:

1. LAMP SWITCH
2. OPERATION SWITCH
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. CLEARANCE LAMPS SWITCH
7. HEX NUT
8. KNURLED NUT

TA 074798

PANEL MOUNTED INSTRUMENTS.

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(1)
b. Installation.	(1)
c. Operational Check.	(1)
	3 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

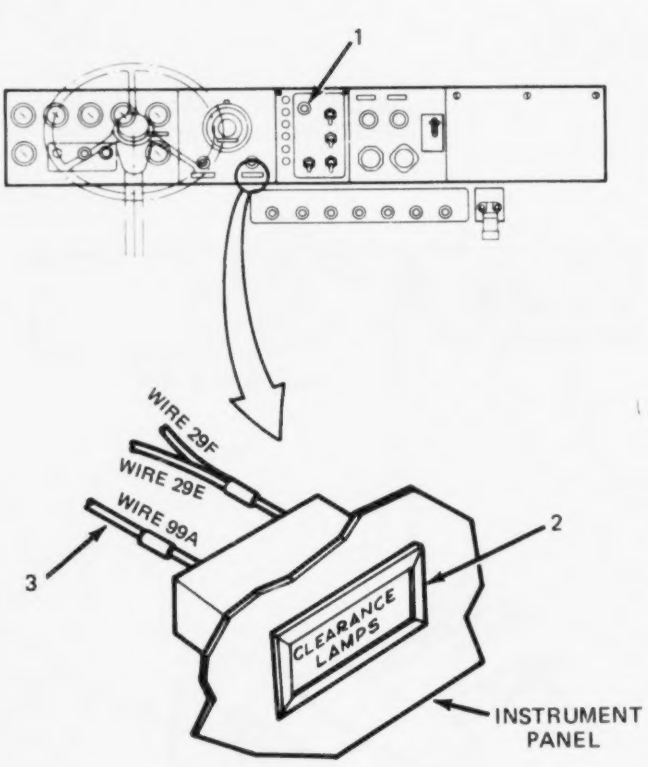
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three wires (3).	Remove from underneath panel.	
2. Clearance indicator lamp unit (2).	Remove from instrument panel by pushing outward from behind panel.	


1
WIRE 29F
WIRE 29E
WIRE 99A
3
2
CLEARANCE LAMPS
INSTRUMENT PANEL

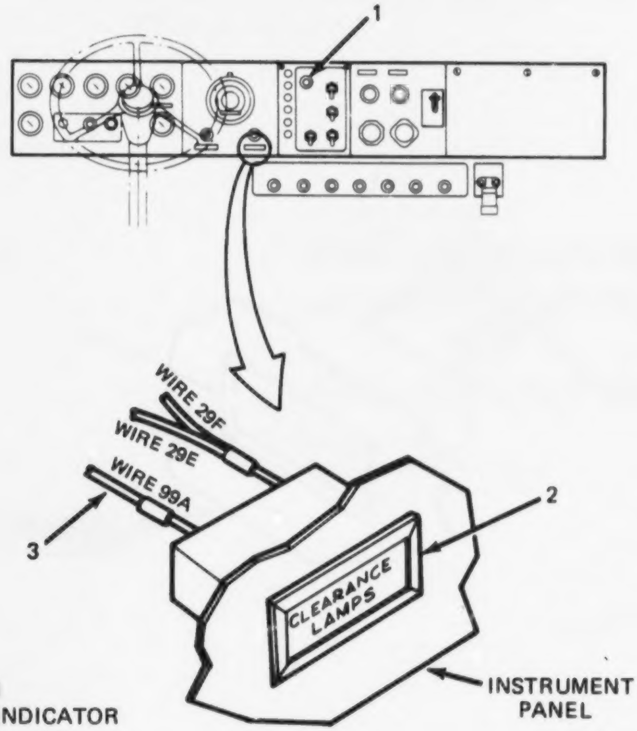
LEGEND:

1. LAMP SWITCH
2. CLEARANCE INDICATOR LAMP UNIT
3. WIRE (3)

TA 074799

5-65. CLEARANCE INDICATOR LAMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
3. Clearance indicator lamp unit (2).	Aline and press into instrument panel.	
4. Three wires (3).	Connect to clearance indicator lamp unit (2).	
5. Batteries.	Connect per paragraph 5-38.	
C. OPERATIONAL CHECK.		
6. LAMP switch (1).	Pull ON. Verify that CLEARANCE LAMPS indicator (2) comes ON.	


1
WIRE 29F
WIRE 29E
WIRE 99A
3
2
CLEARANCE LAMPS
INSTRUMENT PANEL

LEGEND:

1. LAMP SWITCH
2. CLEARANCE INDICATOR LAMP UNIT
3. WIRE (3)

TA 074800

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PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Reading Tachograph Disk.	(AR)
b. Disk Pack Removal.	(2)
c. Disk Pack Installation.	(2)
d. Tachograph Removal.	(7)
e. Tachograph Installation.	(7)
f. Operational Check.	(5)
	23 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Seven Day Disk Pack (7530-01-060-1628).

PERSONNEL REQUIRED

One MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

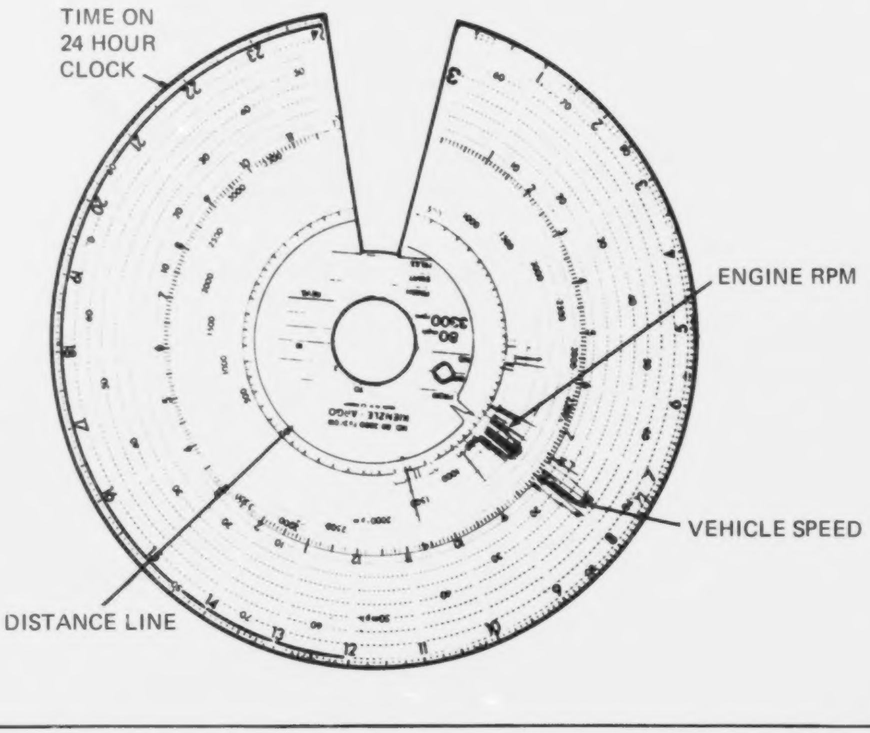
Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-66. TACHOGRAPH MAINTENANCE (Continued).

A. READING TACHOGRAPH DISK.

TIME	The outer ring of the disk has markings for 24 hours. Any events shown on the disk by markings happened at the time shown on the outer ring of the disk. Also, each time the tachograph is opened, a small tic mark is put onto the disk by each stylus. (There is a stylus for vehicle speed, engine speed, and distance).
SPEED	Next to the outer marks for time there is a band about 3/4" wide. The stylus moving in this area records vehicle speed at any moment. You can see at a glance if an operator has been speeding.
RPM	After the speed band, there is a narrower band (about 1/2"). Another stylus moves in this area recording engine RPM. You can see if the engine has been overrevved. You can also determine whether the driver warmed up the engine before moving out. To see this, compare RPM reading with vehicle speed. The disk should record the RPM for the proper number of minutes before vehicle speed is recorded.
DISTANCE	A third stylus moves in the narrowest band, closest to the disk's center. This stylus moves away from the center for 5 miles and then toward the center for 5 miles.

In the disk shown, the vehicle did not move from midnight to about 5:37 AM. Then the engine was started, revved momentarily to about 1800 RPM, then idled at 600 RPM for six or seven minutes, revved to 2100 RPM momentarily, then shut down at about 5:46. At 7:10 AM the engine was started again, idled for 22 minutes. At 7:32 it moved out, attaining a speed of about 28 mph, then stopped and idled for eight minutes. Then it moved out, accelerated to about 45 mph and did stop-and-go driving for about 32 minutes, accelerating from 0 to about 45 mph three times and traveling about 15 miles. At 8:11 it stopped, having traveled about 15 miles, it idled for about 48 minutes and then was shut down at about 9 AM.



TA 075702

PANEL MOUNTED INSTRUMENTS.

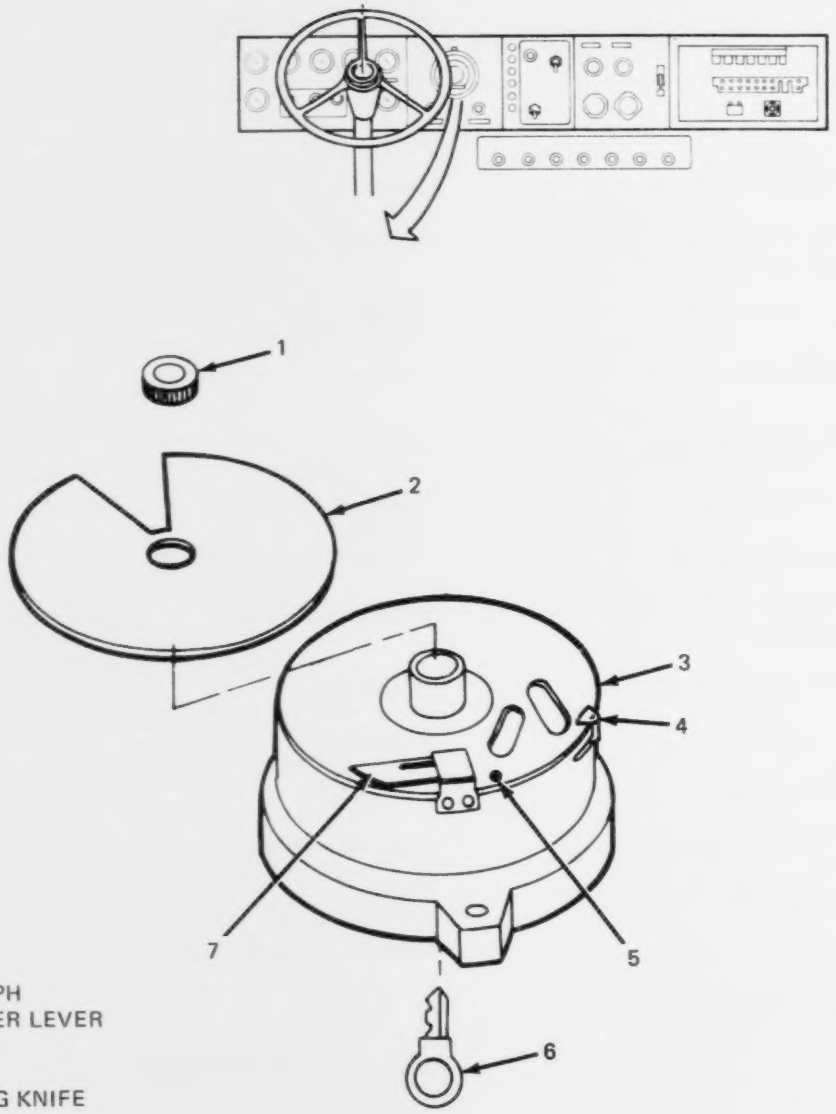
5-66. TACHOGRAPH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISK PACK REMOVAL.		
	CAUTION The disk pack must be changed before the end of the seventh day to prevent stylus damage.	
1. Key (6).	Unlock tachograph (3) with key (6) and swing open.	
2. Retainer (1).	a. Turn to the left and remove. b. Lift out used disk pack (2).	
	NOTE If pack is not properly installed, instruments and dials may not function.	
C. DISK PACK INSTALLATION.		
3. New disk pack (2).	a. Enter date, driver's name, vehicle number and mileage. b. Ensure pack is under separating knife (7) and under tachometer lever (4). c. Aline time at installation with red dot (5) on disk. d. With disk pack in position on center hub, place retainer (1) in place and turn to the right.	Enter in center field on disk number one.
4. Tachograph (3).	Swing up into closed position and lock with key (6).	

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RETAINER
2. DISK PACK
3. TACHOGRAPH
4. TACHOMETER LEVER
5. RED DOT
6. KEY
7. SEPARATING KNIFE

TA 075703

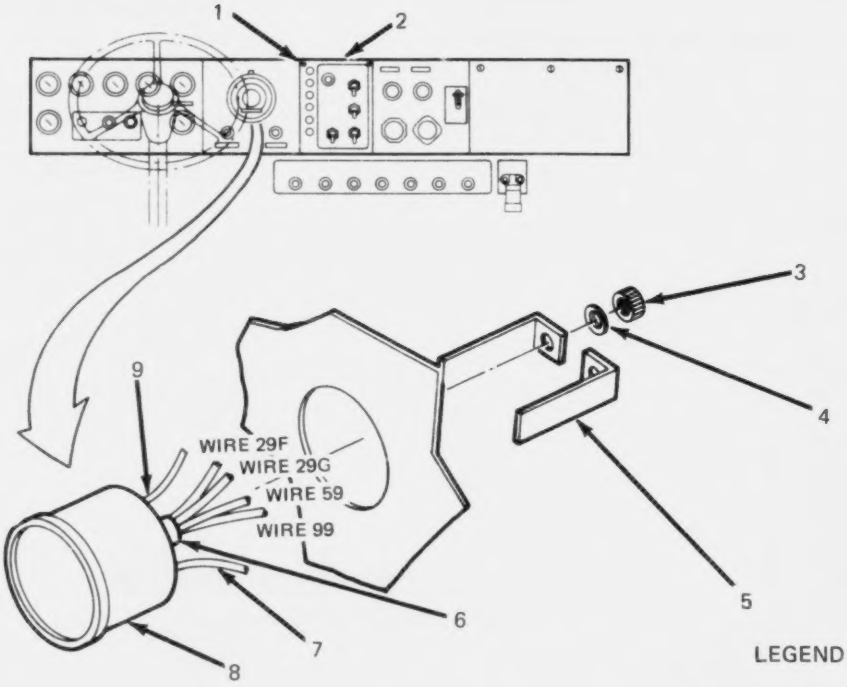
5-66. TACHOGRAPH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. TACHOGRAPH REMOVAL.		
5. Two quarter turn screws (1).	Remove.	
6. Hinged instrument panel (2).	Lower hinged panel.	
7. RPM cable (7).	Disconnect.	
8. MPH cable (9).	Disconnect.	
9. Wire connector (6).	Disconnect.	
10. Two knurled nuts (3) and washers (4).	Remove.	
11. Two brackets (5).	Remove.	
12. Tachograph (8).	Remove.	
E. TACHOGRAPH INSTALLATION.		
13. Tachograph (8).	Insert into panel.	
14. Two brackets (5).	Install on tachograph (8).	
15. Two washers (4) and knurled nuts (3).	Install and tighten.	
16. Wire connector (6).	Reconnect.	
17. MPH cable (9).	Reconnect.	
18. RPM cable (7).	Reconnect.	
19. Hinged instrument panel (2).	Raise into place.	
20. Two quarter-turn screws (1).	Tighten.	
21. Batteries.	Connect per paragraph 5-37B.	
F. OPERATIONAL CHECK.		
22. Engine.	Start (Refer to TM 9-2320-273-10).	
23. Tachograph (8).	Check operation.	
24. Engine.	Shut down (Refer to TM 9-2320-273-10).	

PANEL MOUNTED INSTRUMENTS.

5-66. TACHOGRAPH MAINTENANCE. (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
4
5
6
7
8
9
WIRE 29F
WIRE 29G
WIRE 59
WIRE 99

LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED INSTRUMENT PANEL
3. KNURLED NUT (2)
4. WASHER (2)
5. BRACKET (2)
6. WIRE CONNECTOR
7. RPM CABLE
8. TACHOGRAPH
9. MPH CABLE

TA 074802

ELECTRICAL HORN AND CAB HEATER CONTROL.

5-67. HORN BUTTON MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2.0)
b. Installation.	(2.0)
c. Operational Check.	(0.5)
	4.5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

ALL.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

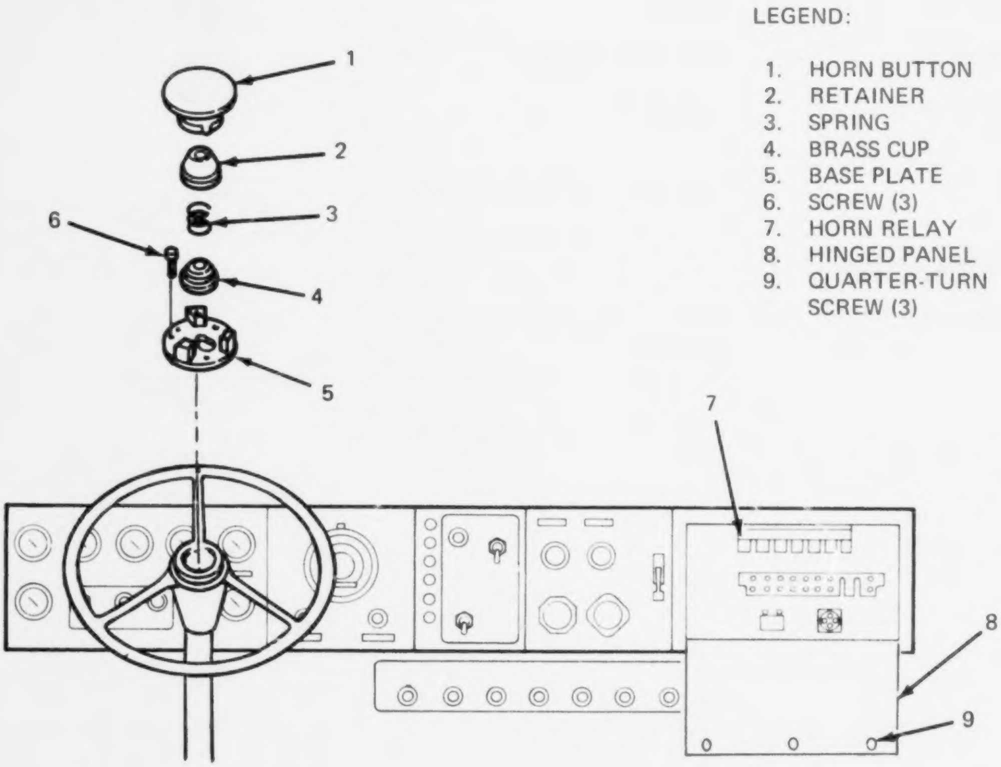
Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

5-67. HORN BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter turn screws (9).	Loosen.	
2. Hinged panel (8).	Lower.	
3. Horn relay (7).	Remove.	
4. Horn button (1).	Push down and twist counter-clockwise, and remove.	
5. Retainer (2), and spring (3).	Remove.	
6. Brass cup (4).	Remove.	



LEGEND:

1. HORN BUTTON
2. RETAINER
3. SPRING
4. BRASS CUP
5. BASE PLATE
6. SCREW (3)
7. HORN RELAY
8. HINGED PANEL
9. QUARTER-TURN SCREW (3)

TA 074803

ELECTRIC HORN AND CAB HEATER CONTROL.

5-67. HORN BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
7. Three screws (6).	Loosen and remove.	
8. Base plate (5).	Remove.	
B. INSTALLATION.		
9. Base plate (5).	Place in steering wheel.	
10. Three screws (6).	Screw in and tighten.	
11. Brass cup (4).	Install.	
12. Spring (3) and retainer (2).	Install over brass cup.	
13. Horn button (1).	Install.	Push down and turn clockwise.
14. Horn relay (7).	Install.	
15. Hinged panel (8).	Raise into position.	
16. Three quarter turn screws (9).	Tighten.	
17. Batteries.	Connect (refer to para 5-37B).	
C. OPERATIONAL CHECK.		
18. Horn button (1).	Press. Verify that horn operates.	

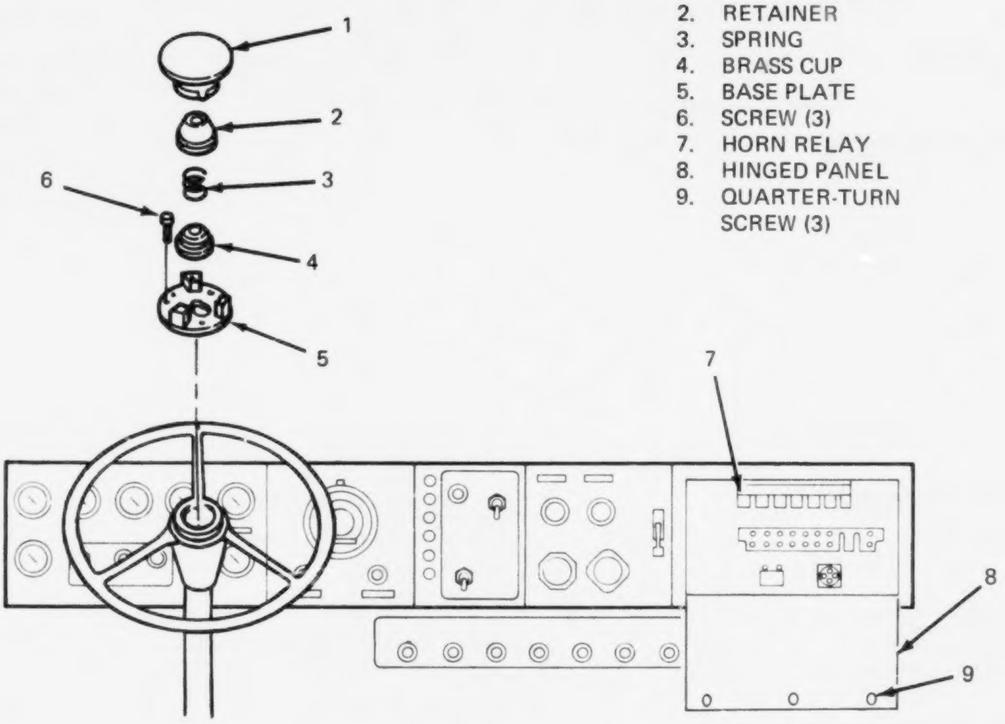
ELECTRIC HORN AND CAB HEATER CONTROL.

5-67. HORN BUTTON MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. HORN BUTTON
2. RETAINER
3. SPRING
4. BRASS CUP
5. BASE PLATE
6. SCREW (3)
7. HORN RELAY
8. HINGED PANEL
9. QUARTER-TURN SCREW (3)



TA 074804

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

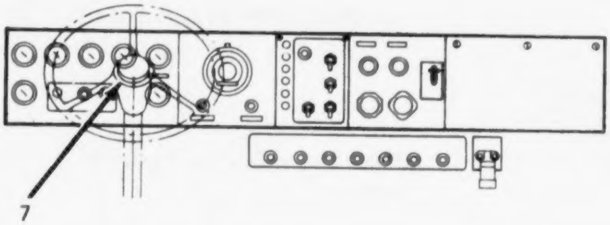
GENERAL SAFETY INSTRUCTIONS

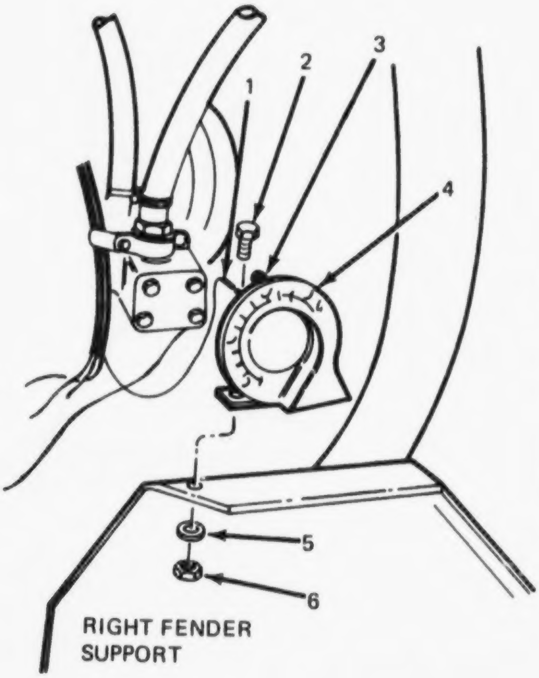
Engine OFF.
Transmission In Neutral.
Park Brake Set.

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire connector (1).	Disconnect.	
2. Bolt (2), washer (5) and nut (6).	Remove.	
3. Horn assembly (4).	Remove.	





LEGEND:

1. WIRE CONNECTOR
2. BOLT
3. HORN ADJUSTING SCREW
4. HORN ASSEMBLY
5. WASHER
6. NUT
7. HORN BUTTON

TA 074805

ELECTRIC HORN AND CAB HEATER CONTROL.

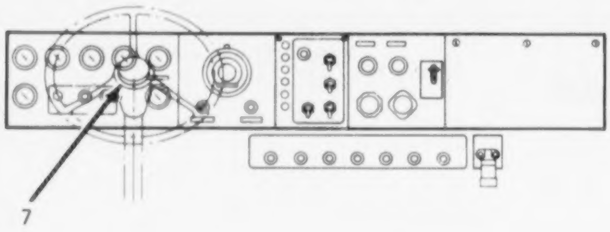
5-68. HORN MAINTENANCE (Continued).

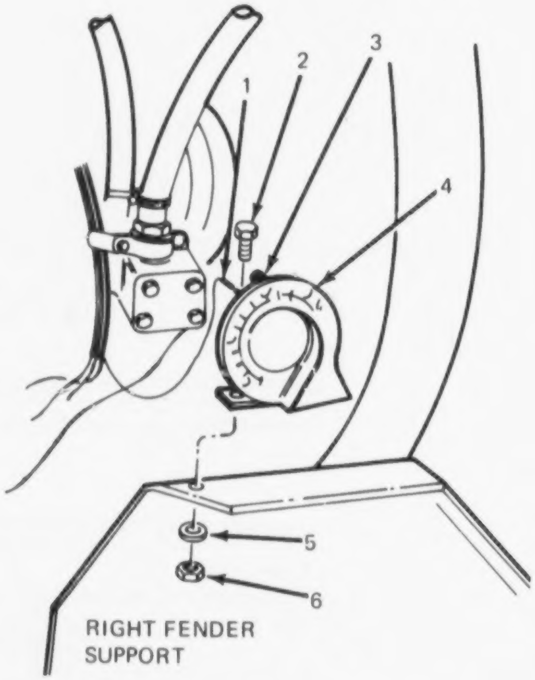
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Horn assembly (4).	Replace and aline mounting hole.	
5. Bolt (2), washer (5) and nut (6).	Replace and tighten.	
6. Wire connector (1).	Reconnect.	
7. Batteries	Connect (refer to para 5-37B).	
C. OPERATIONAL CHECK.		
8. Horn button (7).	Press and verify the horn works.	First mechanic.
9. Horn adjusting screw (3).	Adjust for maximum loudness.	Second mechanic.

ELECTRIC HORN AND CAB HEATER CONTROL.

5-68. HORN MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS




1
2
3
4
5
6
RIGHT FENDER
SUPPORT

LEGEND:

1. WIRE CONNECTOR
2. BOLT
3. HORN ADJUSTING SCREW
4. HORN ASSEMBLY
5. WASHER
6. NUT
7. HORN BUTTON

LEGEND:

TA 074806

ELECTRIC HORN AND CAB HEATER CONTROL.

5-69. HEATER FAN SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

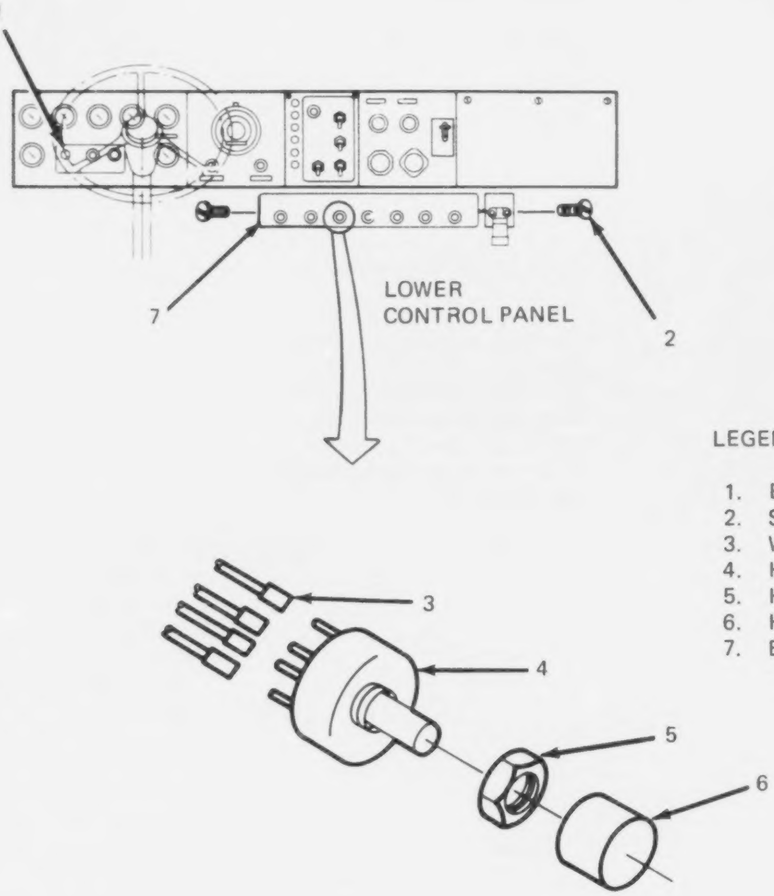
Engine OFF.
Transmission In Neutral.
Park Brake Set.

ELECTRIC HORN AND CAB HEATER CONTROL.

5-69. HEATER FAN SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two screws (2).	Remove.	
2. Back panel cover (7).	Slide back over cables.	
3. Heater knob (6).	Pull off.	
4. Hex nut (5).	Remove.	
5. Heater fan switch (4).	Remove from lower control panel.	
6. Four wires (3).	Remove.	Tag for proper location.



LEGEND:

1. ENGINE RUN SWITCH
2. SCREW (2)
3. WIRE (4)
4. HEATER FAN SWITCH
5. HEX NUTS
6. HEATER
7. BACK PANEL COVER

TA 074807

ELECTRIC HORN AND CAB HEATER CONTROL.

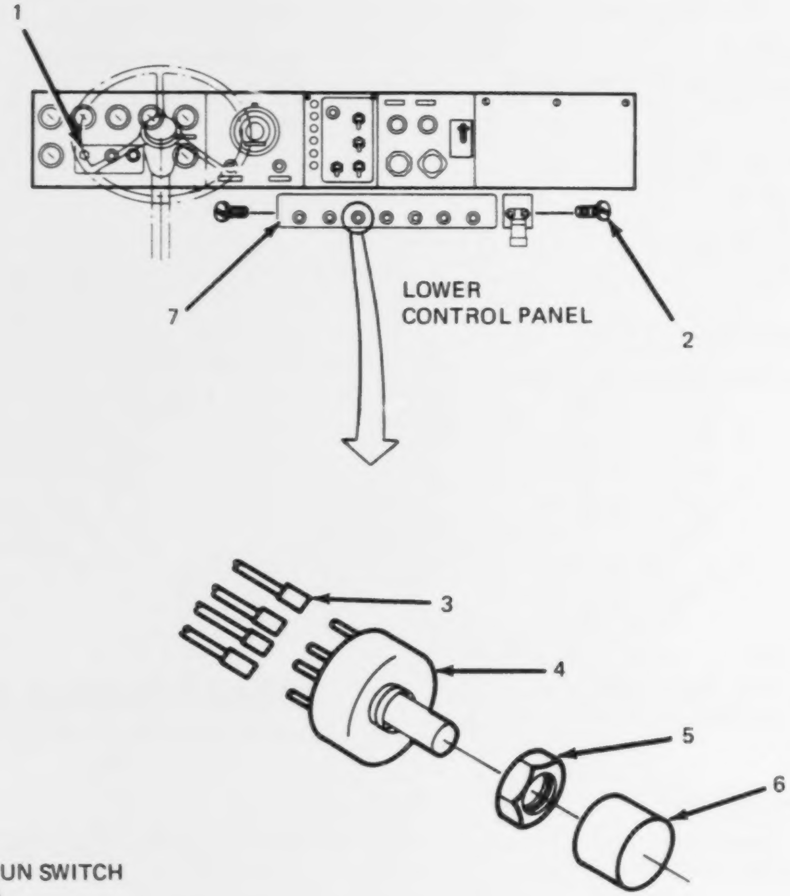
5-69. HEATER FAN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Four wires (3).	Install on heater fan switch (4).	
8. Heater fan switch (4).	Aline and install in lower control panel.	
9. Hex nut (5).	Install and tighten.	
10. Heater knob (6).	Install.	
11. Back panel cover (7).	Slide over cables and press on back of lower control panel.	
12. Two screws (2).	Install and tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
14. ENGINE RUN switch (1).	Turn left to accessory.	
15. HEATER FAN switch (4).	Rotate heater knob (6) through all positions (Lo, Medium, Hi) and verify the heater fan increases and decreases accordingly. Verify that fan motor shuts off with heater knob (6) set to OFF.	

ELECTRIC HORN AND CAB HEATER CONTROL.

5-69. HEATER FAN SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
LOWER
CONTROL PANEL
7
2
3
4
5
6

LEGEND:

1. ENGINE RUN SWITCH
2. SCREW (2)
3. WIRE (4)
4. HEATER FAN SWITCH
5. HEX NUTS
6. HEATER
7. BACK PANEL COVER

TA 074808

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

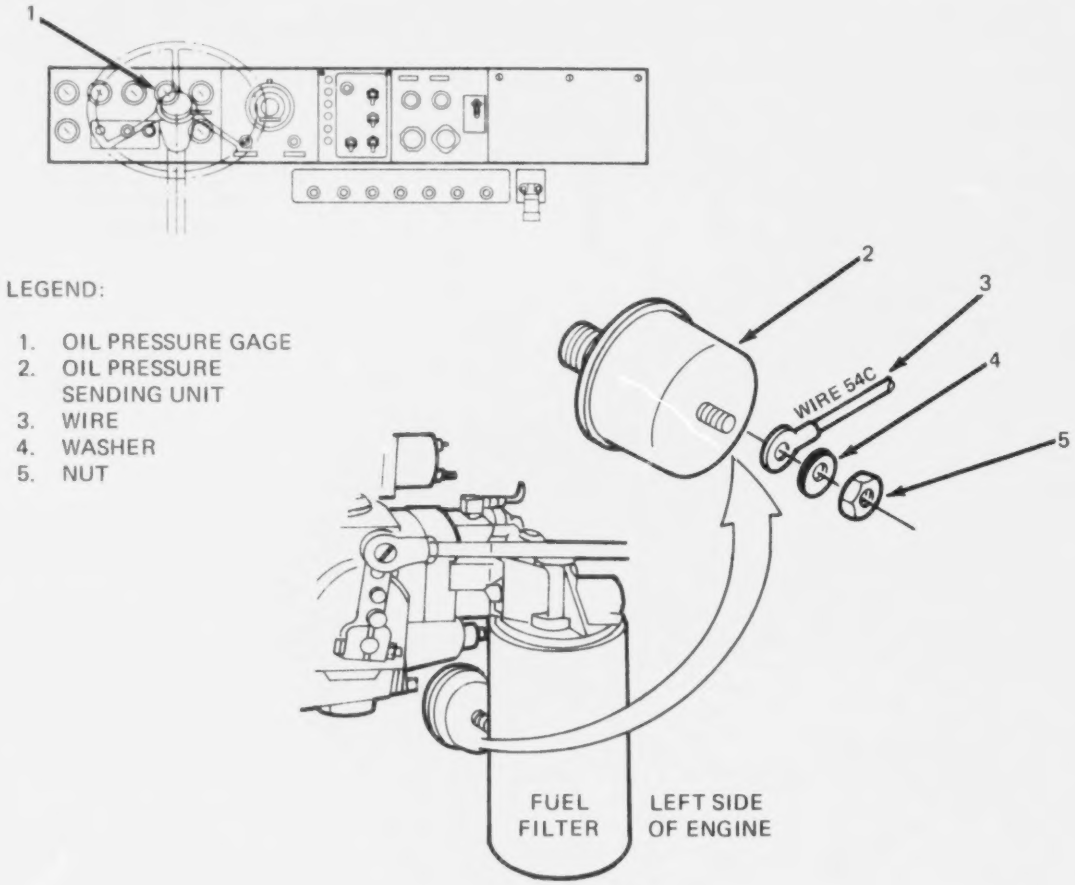
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove.	
3. Oil pressure sending unit (2).	Remove.	


1
2
3
WIRE 54C
4
5
FUEL FILTER
LEFT SIDE OF ENGINE

LEGEND:

1. OIL PRESSURE GAGE
2. OIL PRESSURE SENDING UNIT
3. WIRE
4. WASHER
5. NUT

TA 074809

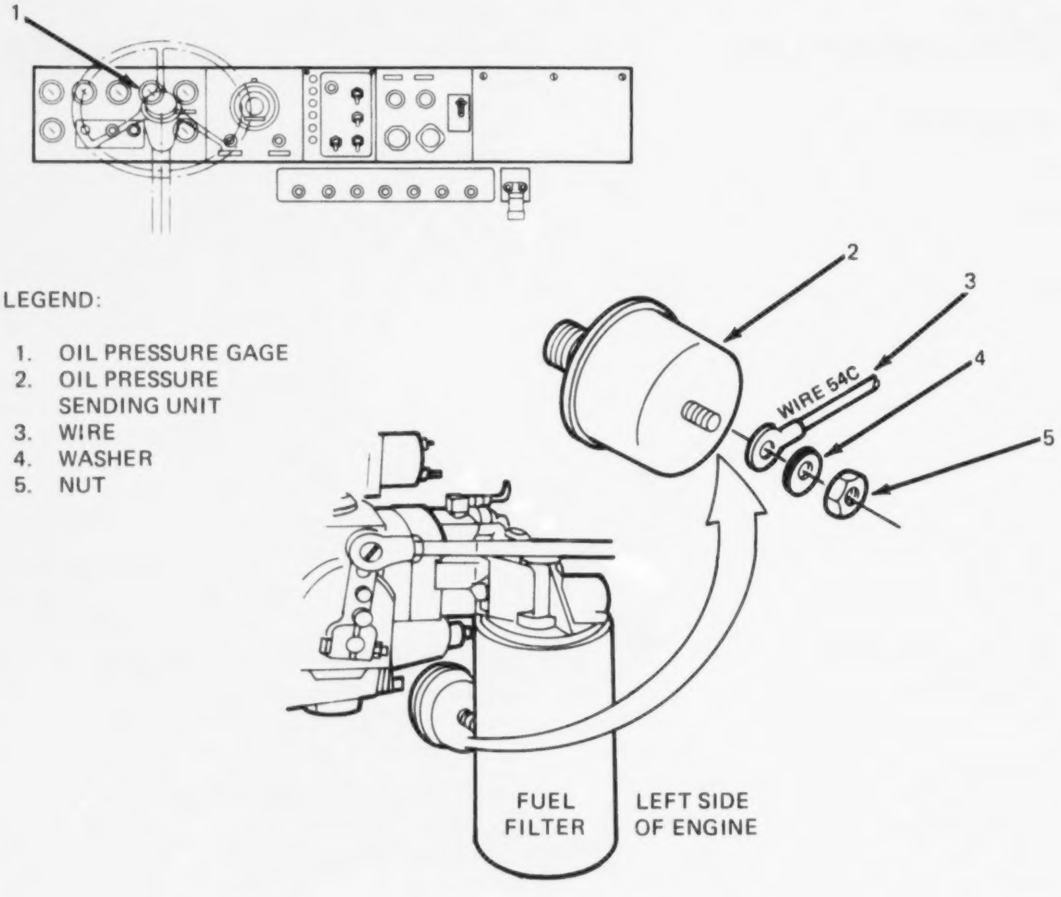
5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Oil pressure sending unit (2).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on oil pressure sending unit (2).	
6. Washer (4) and nut (5).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. Oil pressure gage (1).	Observe that gage indicates a pressure reading.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-70. OIL PRESSURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
4
5
WIRE 54C
FUEL FILTER
LEFT SIDE OF ENGINE

LEGEND:

1. OIL PRESSURE GAGE
2. OIL PRESSURE SENDING UNIT
3. WIRE
4. WASHER
5. NUT

TA 074810

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-6.

SPECIAL ENVIRONMENTAL CONDITIONS

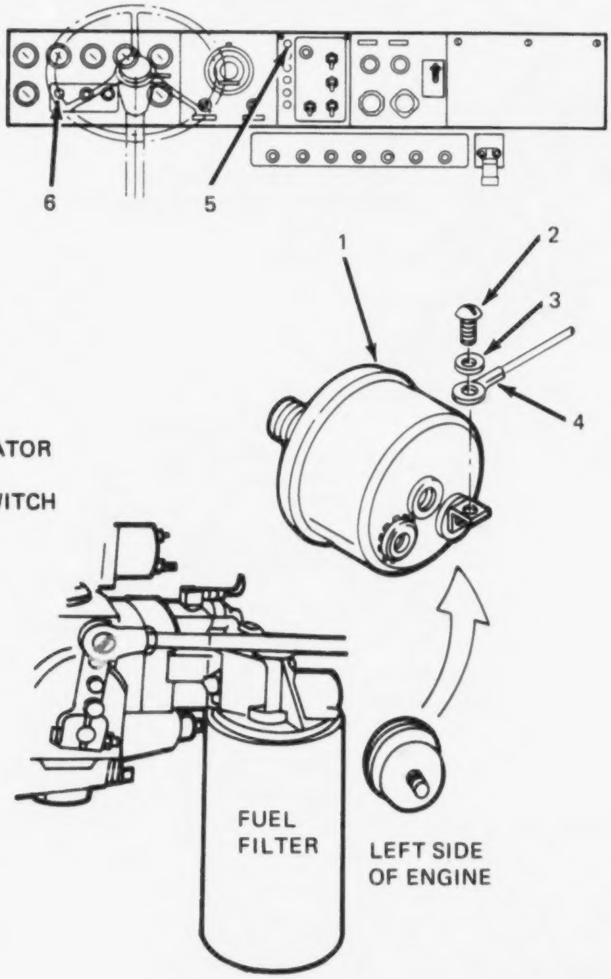
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

5-71. OIL PRÉSSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (2) and washer (3).	Remove.	
2. Wire (4).	Remove.	
3. Oil pressure switch (1).	Remove.	


6
5
1
2
3
4
FUEL FILTER
LEFT SIDE OF ENGINE

LEGEND:

1. OIL PRESSURE SWITCH
2. SCREW
3. WASHER
4. WIRE
5. LOW OIL INDICATOR LAMP
6. ENGINE RUN SWITCH

TA 074811

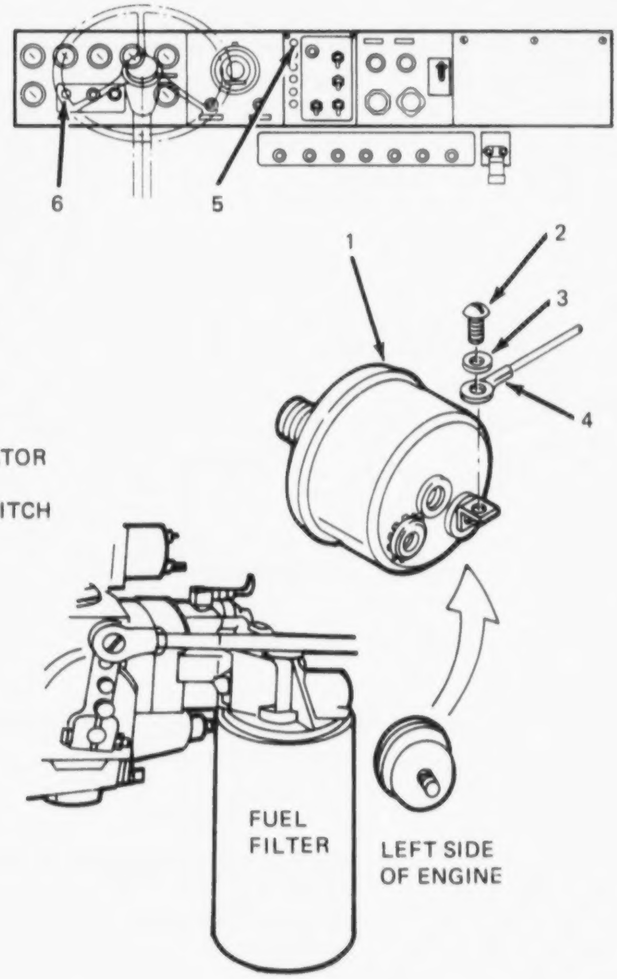
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-71. OIL PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Oil pressure switch (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (4).	Place on oil pressure switch (1).	
6. Washer (3) and screw (2).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine Run switch (6).	Turn ON. Verify that Low Oil indicator (5) lamp goes ON.	

5-71. OIL PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


6
5
1
2
3
4
FUEL FILTER
LEFT SIDE OF ENGINE

LEGEND:

1. OIL PRESSURE SWITCH
2. SCREW
3. WASHER
4. WIRE
5. LOW OIL INDICATOR LAMP
6. ENGINE RUN SWITCH

TA 074812

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(10)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Radiator Drained Below Sending Unit Level.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

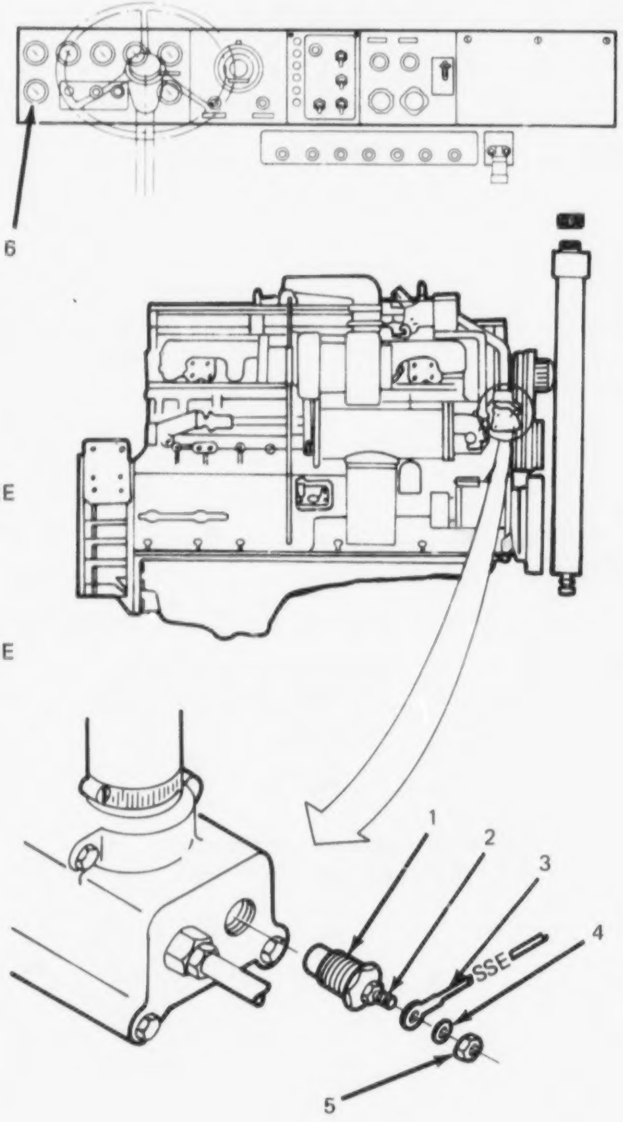
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. WATER TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. NUT
6. WATER TEMPERATURE GAGE

TA 074813

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove from terminal (2).	
3. Water temperature sending unit (1).	Remove.	
B. INSTALLATION.		
4. Water temperature sending unit (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on terminal (2).	
6. Washer (4) and nut (5).	Install and tighten.	
C. OPERATIONAL CHECK.		
7. Engine	Start up (see TM 9-2320-273-10).	
8. Water temperature gage (6).	Observe that temperature increases as truck engine warms up.	

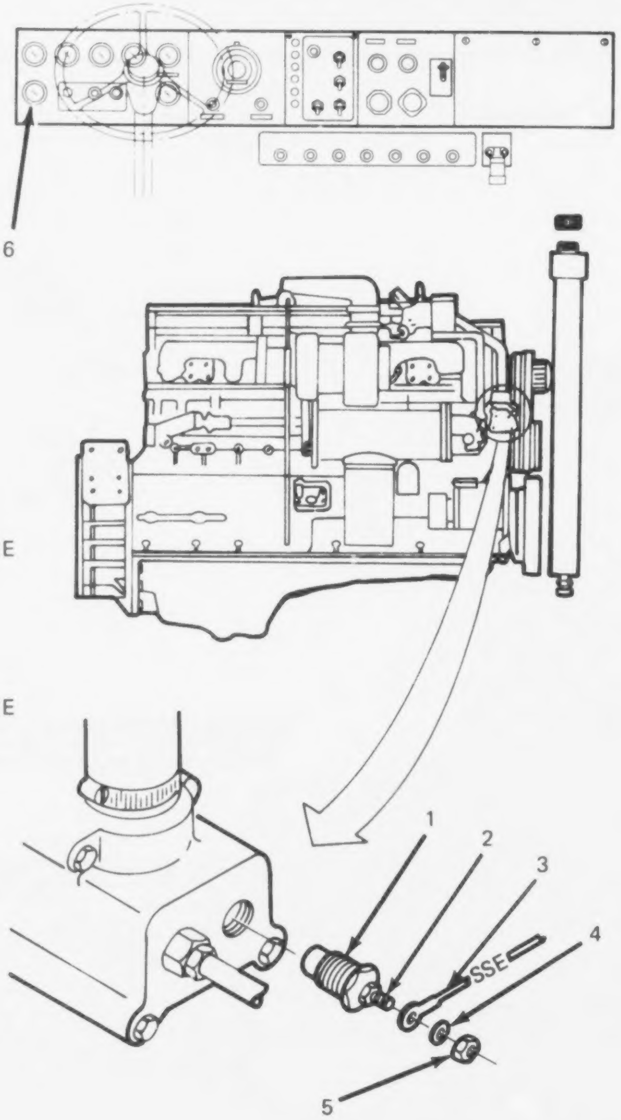
NOTE

Follow on maintenance required:
Fill radiator per paragraph 4-42.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-72. WATER TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. WATER TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. NUT
6. WATER TEMPERATURE GAGE

TA 074814

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(20)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Radiator Drained Below Switch Level.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

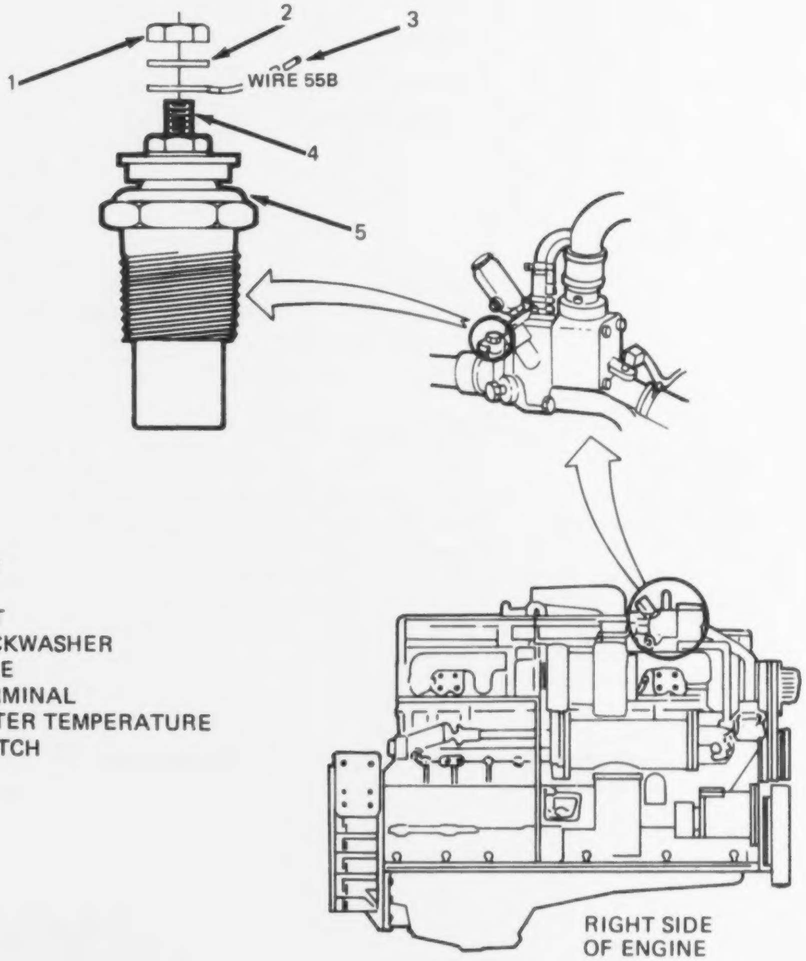
Engine OFF.
Transmission In Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Nut (1) and lockwasher (2).	Remove.	
2. Wire (3).	Remove from terminal (4).	


2
3
1
WIRE 55B
4
5
RIGHT SIDE OF ENGINE

LEGEND:

1. NUT
2. LOCKWASHER
3. WIRE
4. TERMINAL
5. WATER TEMPERATURE SWITCH

TA 074815

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Water temperature switch (5).	Remove.	
B. INSTALLATION.		
4. Water temperature switch (5).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Place on terminal (4).	
6. Lockwasher (2) and nut (1).	Install on terminal (4) and tighten.	
C. OPERATIONAL CHECK.		
7. Engine.	Start (refer to TM 9-2320-273-10). Monitor WATER TEMP gage, switch should close and activate indicator lamp when coolant reaches 225°F (107°C).	

WARNING

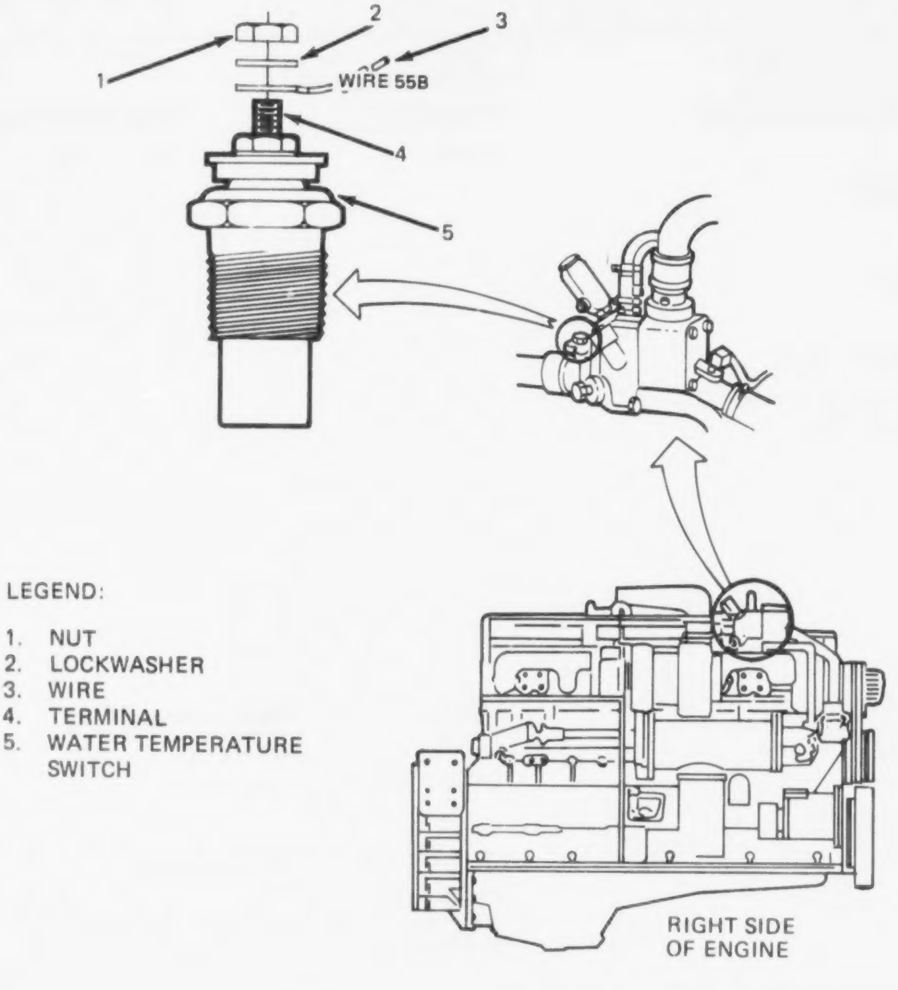
Let radiator cool before removing cap. Remove radiator cap in two steps. First, place a thick cloth over the cap and slowly rotate cap left to its first stop; pause, and let pressure escape from the cooling system. Then rotate cap farther left until you can remove it. Failure to follow this procedure can result in serious burns.

NOTE

Follow-on maintenance required: Fill radiator per paragraph 4-42.

5-73. WATER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
WIRE 55B
4
5
RIGHT SIDE OF ENGINE

LEGEND:

1. NUT
2. LOCKWASHER
3. WIRE
4. TERMINAL
5. WATER TEMPERATURE SWITCH

TA 074816

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-74. ETHER TEMPERATURE SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation.	(2)
c. Operational Check.	(2)
	6 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Container (Approx 2 gal).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Radiator Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-3.

SPECIAL ENVIRONMENTAL CONDITIONS

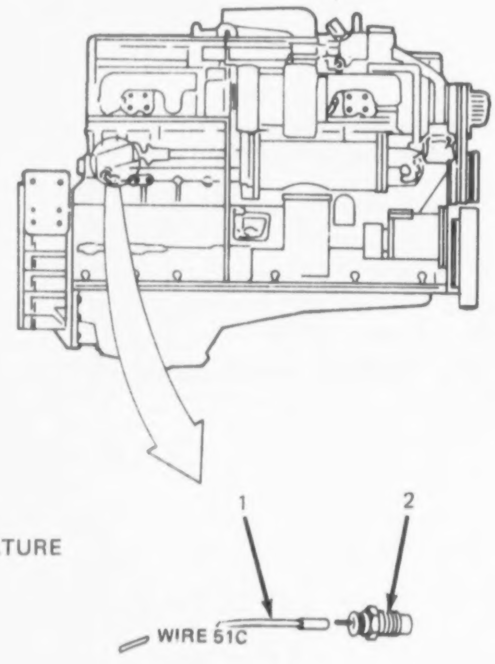
Vehicle Parked on Level Ground.
Coolant Temperature Below 50°F.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

5-74. ETHER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Wire connector (1).	Remove.	
2. Ether temperature switch (2).	Remove.	Place container to catch coolant draining from block.



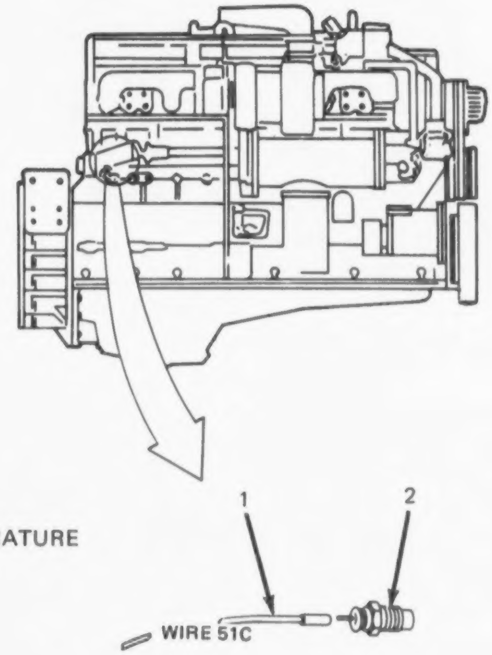
LEGEND:

1. WIRE CONNECTOR
2. ETHER TEMPERATURE SWITCH

TA 074817

5-74. ETHER TEMPERATURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
3. Ether temperature switch (2).	Coat threads with liquid teflon. Install and tighten.	
4. Wire connector (1).	Reconnect.	
C. OPERATIONAL CHECK.		
	NOTE Follow-on maintenance required: Fill radiator per paragraph 4-42.	
5. Engine.	Start using cold start procedure (refer to TM 9-2320-273-10).	



LEGEND:

1. WIRE CONNECTOR
2. ETHER TEMPERATURE SWITCH

TA 074818

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 6-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

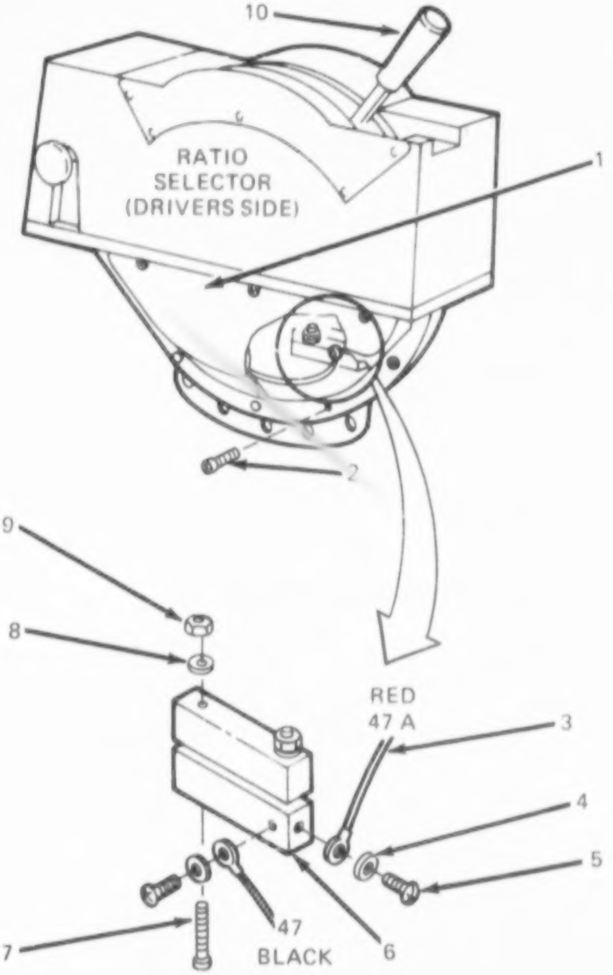
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nine screws (2).	Remove.	
2. Ratio selector side cover (1).	Remove.	
3. Two screws (5) and washers (4).	Remove.	


10
RATIO SELECTOR (DRIVERS SIDE)
1
2
9
8
RED 47 A
3
4
5
7
47 BLACK
6

LEGEND:

1. RATIO SELECTOR SIDE COVER
2. SCREW (9)
3. WIRE (2)
4. WASHER (2)
5. SCREW (2)
6. NEUTRAL SAFETY SWITCH
7. SCREW (2)
8. WASHER (2)
9. NUT (2)
10. RATIO SELECTOR LEVER

TA 074819

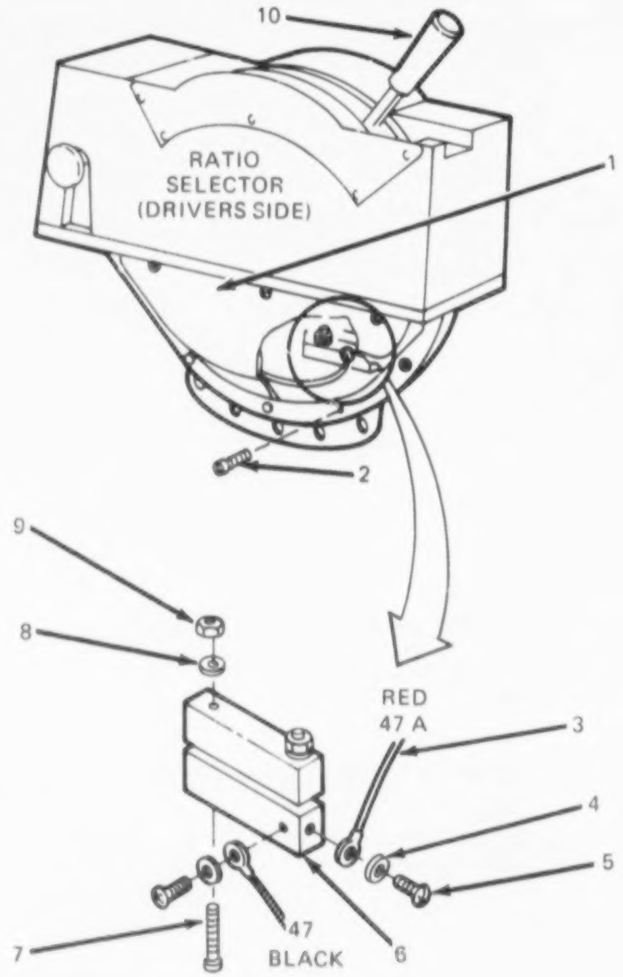
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Two wires (3).	Remove.	
5. Two screws (7), washers (8) and nuts (9).	Remove.	
6. Neutral safety switch (6).	Remove.	
B. INSTALLATION.		
7. Neutral safety switch (6).	Aline and install.	
8. Two screws (7), washers (8) and nuts (9).	Install and tighten.	
9. Two wires (3), washers (4) and screws (5).	Install and tighten on neutral safety switch (6).	Install per illustration.
10. Ratio selector side cover (1).	Aline and install.	
11. Nine screws (2).	Install and tighten.	
C. OPERATIONAL CHECK.		
12. Ratio selector lever (10).	Set to N.	
13. Engine.	Start up (see TM 9-2320-273-10).	

5-75. NEUTRAL SAFETY SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


10
RATIO SELECTOR (DRIVERS SIDE)
1
2
9
8
RED 47 A
3
4
5
7
47 BLACK
6

LEGEND:

1. RATIO SELECTOR SIDE COVER
2. SCREW (9)
3. WIRE (2)
4. WASHER (2)
5. SCREW (2)
6. NEUTRAL SAFETY SWITCH
7. SCREW (2)
8. WASHER (2)
9. NUT (2)
10. RATIO SELECTOR LEVER

TA 074820

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation.	(2)
c. Operational Check.	(20)
	24 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
6-9A.	Transmission Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

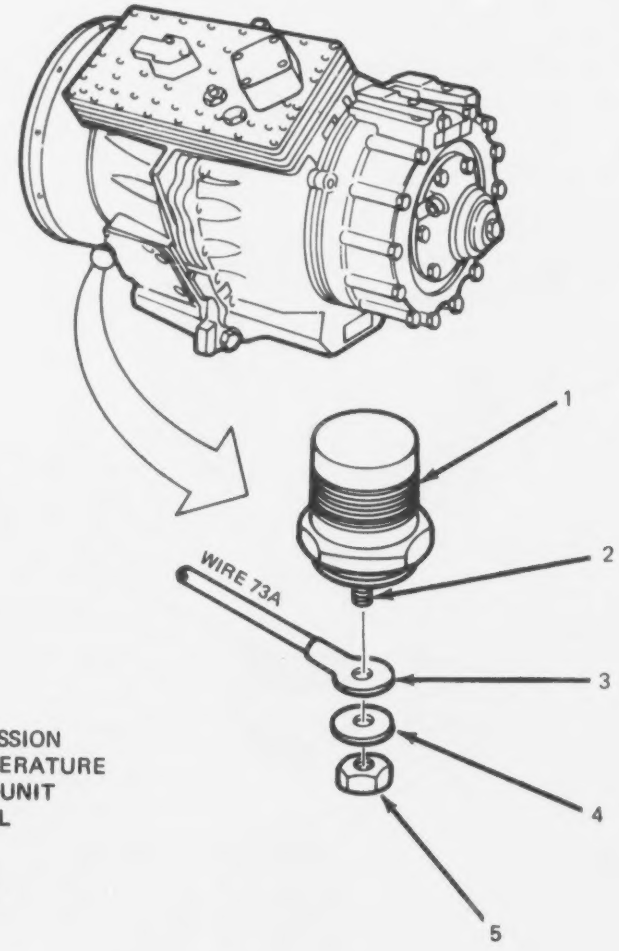
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Hex nut (5) and washer (4).	Remove.	
2. Wire (3).	Remove from terminal (2).	
3. Transmission oil temperature sending unit (1).	Remove.	



LEGEND:

1. TRANSMISSION OIL TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. HEX NUT

TA 074821

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

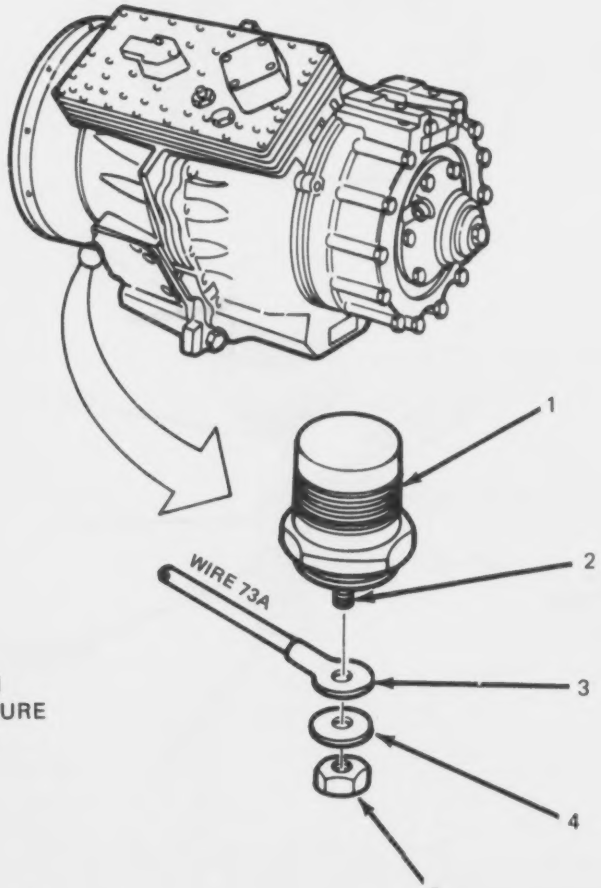
B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
4. Transmisison oil temperature sending unit (1).	Coat threads with liquid teflon. Install and tighten.	
5. Wire (3).	Replace on terminal (2).	
6. Washer (4) and hex nut (5).	Replace on terminal (2), and tighten.	

NOTE

Follow on maintenance required:

Fill transmission per paragraph 6-9.



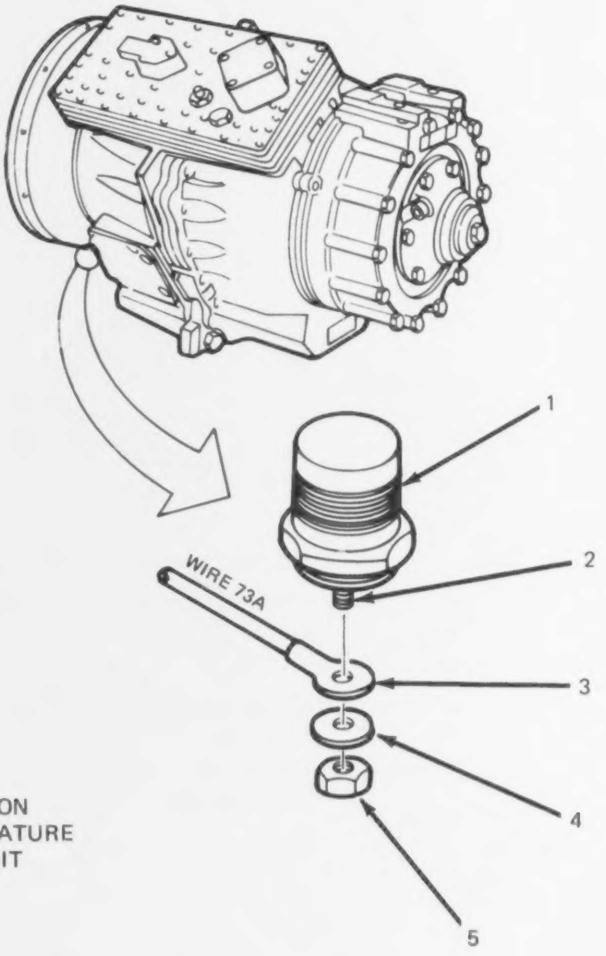
LEGEND:

1. TRANSMISSION OIL TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. HEX NUT

TA 074822

5-76. TRANSMISSION OIL TEMPERATURE SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
7. Engine.	Start-up (refer to TM 9-2320-273-10). Check TRANS OIL TEMP gage to be certain temperature readings go up as the oil warms.	



LEGEND:

1. TRANSMISSION OIL TEMPERATURE SENDING UNIT
2. TERMINAL
3. WIRE
4. WASHER
5. HEX NUT

TA 074823

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
6-9C.	Cab Floor Inspection Plate Removed.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-12.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

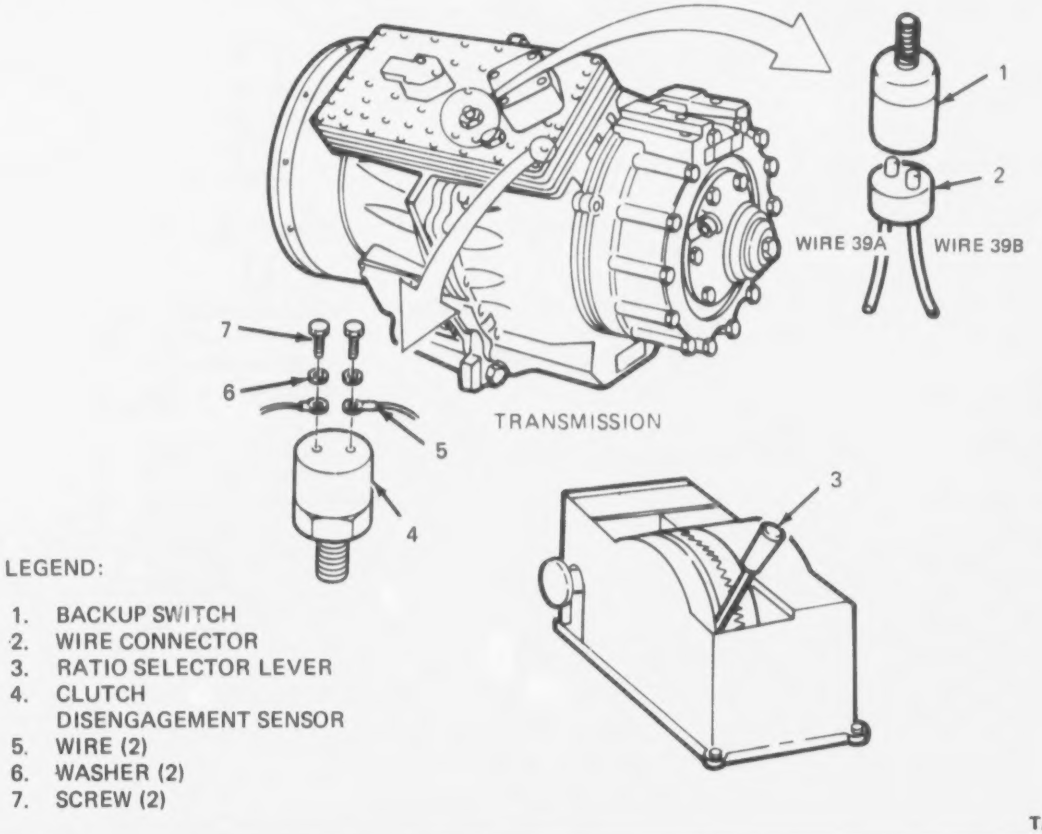
LOCATION/ITEM	ACTION	REMARKS

NOTE

On M915 model only, access can be gained outside truck by reaching through under cab floor.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Wire Connector (2).	Disconnect.	
2. Backup switch (1).	Remove.	
3. Two screws (7) and washers (6).	Unscrew and remove two wires (5).	Mark for identification.
4. Clutch disengagement sensor (4).	Unscrew and remove.	



LEGEND:

1. BACKUP SWITCH
2. WIRE CONNECTOR
3. RATIO SELECTOR LEVER
4. CLUTCH DISENGAGEMENT SENSOR
5. WIRE (2)
6. WASHER (2)
7. SCREW (2)

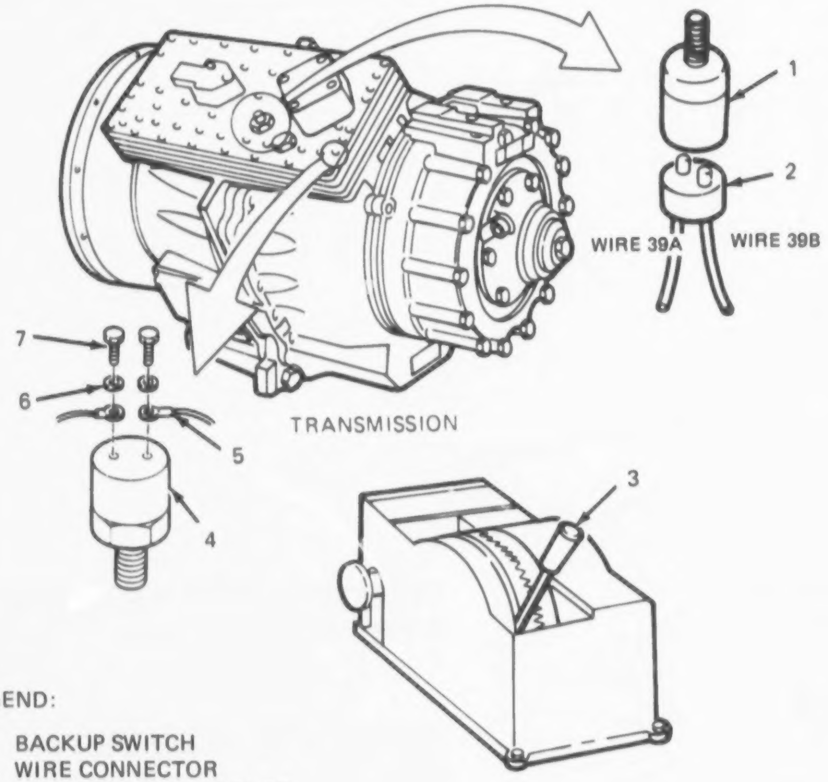
TA 074824

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Backup switch (1).	Coat threads with liquid Teflon. Install and tighten.	
6. Wire connector (2).	Connect to backup switch (1).	
7. Clutch disengagement sensor (4).	Apply liquid Teflon to threads and screw into valve body.	
8. Two wires (5).	Fasten to terminals with two washers (6) and screws (7).	
9. Cab floor inspection plate.	Replace per paragraph 6-9. (M916 thru M920 only).	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Ratio selector lever (3).	Set to R1 or R2	First mechanic.
	Verify that backup lamps come ON.	Second mechanic.
12. Vehicle.	Test drive. Check operation of engine retarder (see TM 9-2320-273-10).	Disengagement sensor should override engine retarder when rpm drops below 700.

5-77. BACKUP SWITCH AND CLUTCH DISENGAGEMENT SENSOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
WIRE 39A
WIRE 39B
7
6
5
TRANSMISSION
4
3

LEGEND:

1. BACKUP SWITCH
2. WIRE CONNECTOR
3. RATIO SELECTOR LEVER
4. CLUTCH DISENGAGEMENT SENSOR
5. WIRE (2)
6. WASHER (2)
7. SCREW (2)

TA 074825

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-78. BACKUP ALARM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-6.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

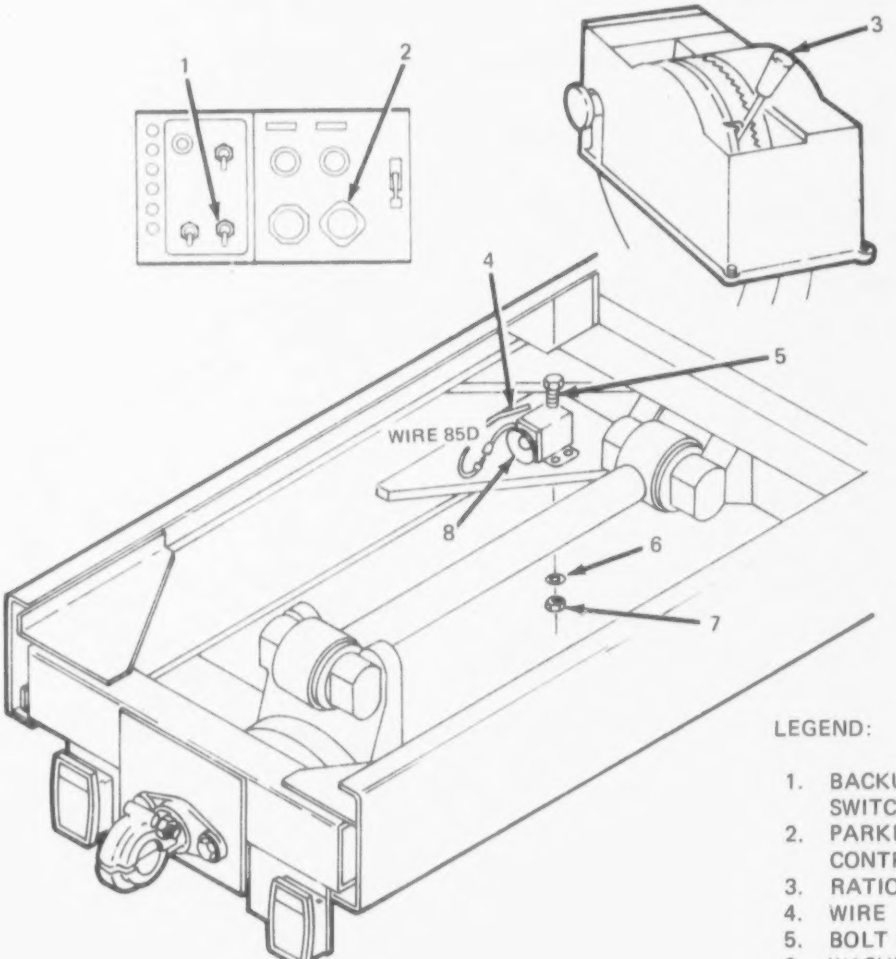
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

5-78. BACKUP ALARM MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Wire (4).	Disconnect.	
2. Four bolts (5), washers (6), and nuts (7).	Remove.	
3. Backup alarm (8).	Remove.	



LEGEND:

1. BACKUP ALARM SWITCH
2. PARKING BRAKE CONTROL
3. RATIO SELECTOR
4. WIRE
5. BOLT (4)
6. WASHER (4)
7. NUT (4)
8. BACKUP ALARM

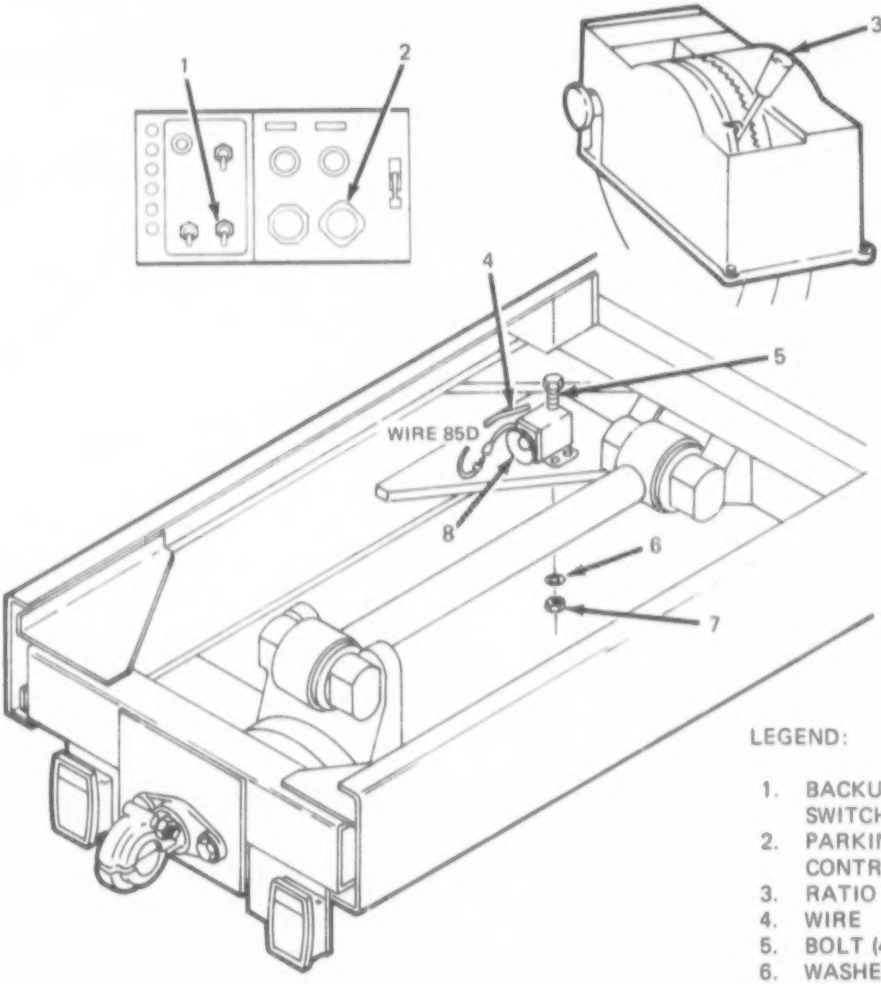
TA 074826

5-78. BACKUP ALARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Backup alarm (8).	Aline mounting holes.	
5. Four bolts (5), washers (6), and nuts (7).	Install and tighten.	
6. Wire (4).	Reconnect.	
C. OPERATIONAL CHECK.		
7. Engine.	Start up (see TM 9-2320-273-10).	
8. BACKUP ALARM switch (1).	Set to NORMAL.	
9. PARKING BRAKE control (2).	Pull ON.	
10. Ratio selector (3).	Set to R1 or R2.	
11. Backup alarm (8).	Verify that alarm operates.	

5-78. BACKUP ALARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BACKUP ALARM SWITCH
2. PARKING BRAKE CONTROL
3. RATIO SELECTOR
4. WIRE
5. BOLT (4)
6. WASHER (4)
7. NUT (4)
8. BACKUP ALARM

TA 074827

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(1)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Sending Unit Gasket (2013).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

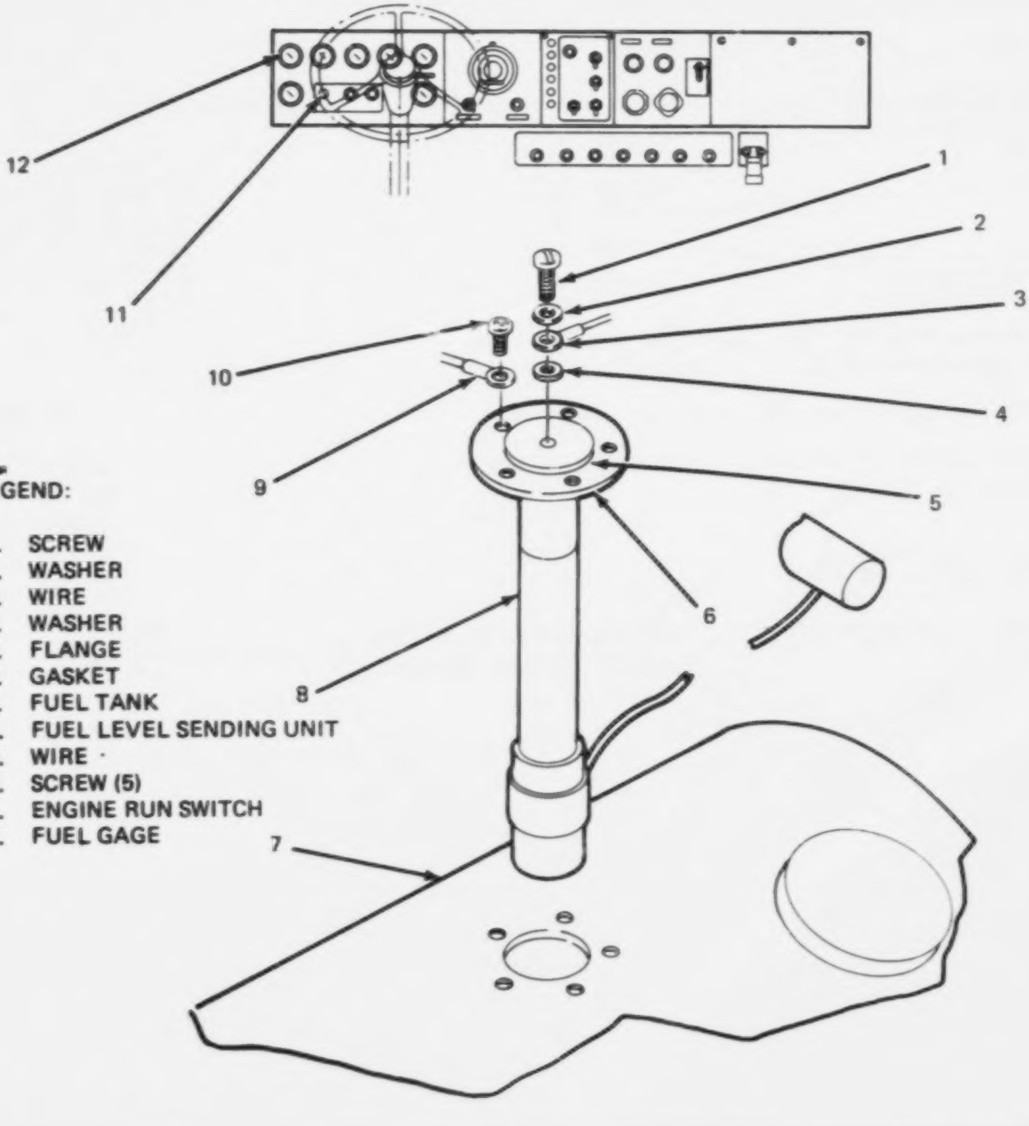
Engine Off.
Transmission in Neutral.
Park Brake Set.

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not smoke or handle flammable materials while performing this task. Flame or explosion will cause physical injury.



LEGEND:

1. SCREW
2. WASHER
3. WIRE
4. WASHER
5. FLANGE
6. GASKET
7. FUEL TANK
8. FUEL LEVEL SENDING UNIT
9. WIRE
10. SCREW (5)
11. ENGINE RUN SWITCH
12. FUEL GAGE

TA 074828

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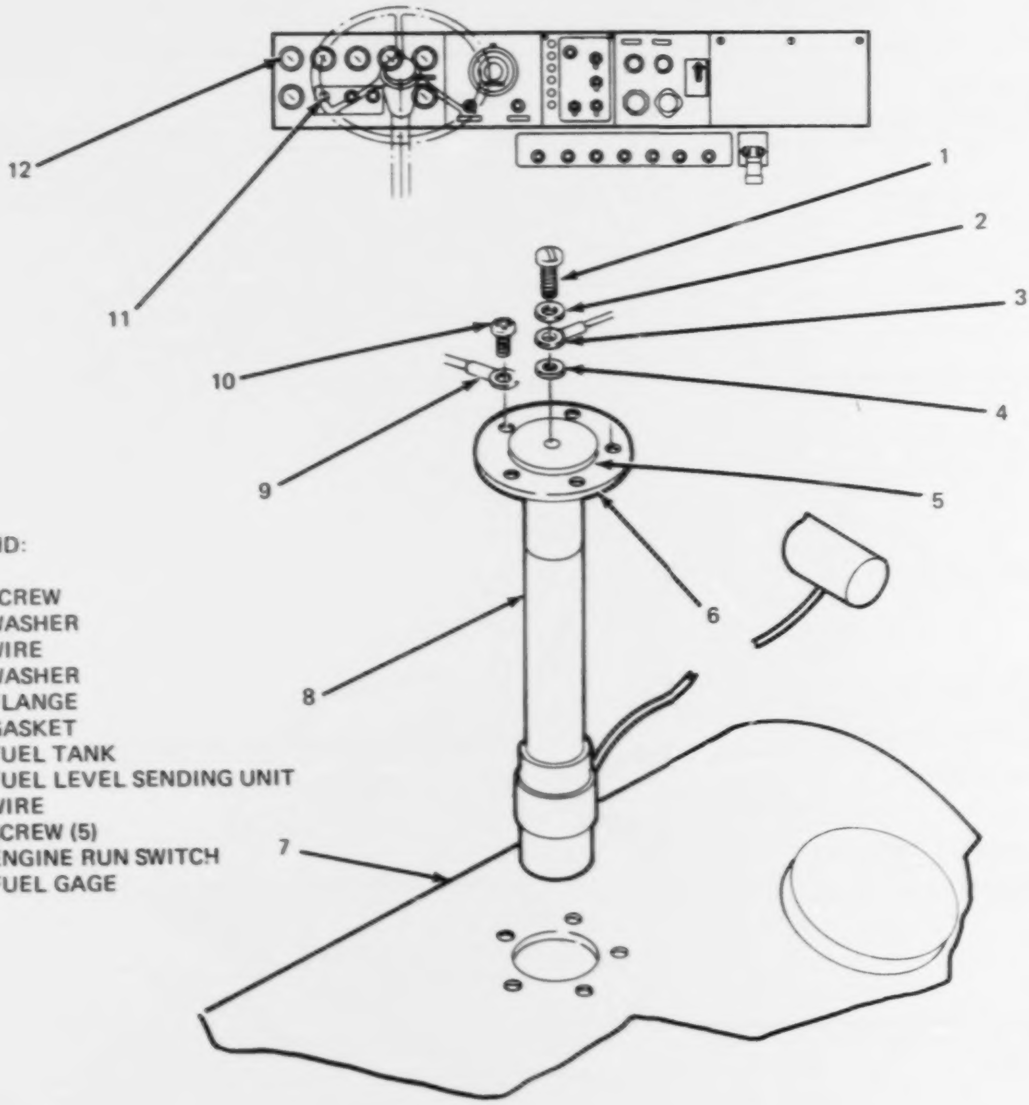
5-79. FUEL LEVEL SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (1) and washers (2) and (4).	Remove.	
2. Wire (3).	Remove.	
3. Five screws (10).	Remove.	
4. Wire (9).	Remove	
5. Flange (5), gasket (6), and fuel level sending unit (8).	Remove from tank (7).	Discard gasket (6).
B. INSTALLATION.		
6. Fuel level sending unit (8), gasket (6), and flange (5).	Aline and insert into tank (7).	
7. Wire (9) and five screws (10).	Install and tighten.	
8. Wire (3), washers (2) and (4), and screw (1).	Install and tighten.	
C. OPERATIONAL CHECK.		
9. ENGINE RUN switch (11).	Turn ON. Verify that FUEL gage (12) indicates fuel level.	

5-79. FUEL LEVEL SENDING UNIT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SCREW
2. WASHER
3. WIRE
4. WASHER
5. FLANGE
6. GASKET
7. FUEL TANK
8. FUEL LEVEL SENDING UNIT
9. WIRE
10. SCREW (5)
11. ENGINE RUN SWITCH
12. FUEL GAGE

TA 074829

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(8)
b. Installation.	(5)
c. Operational Check.	(3)
	16 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-6.

SPECIAL ENVIRONMENTAL CONDITIONS

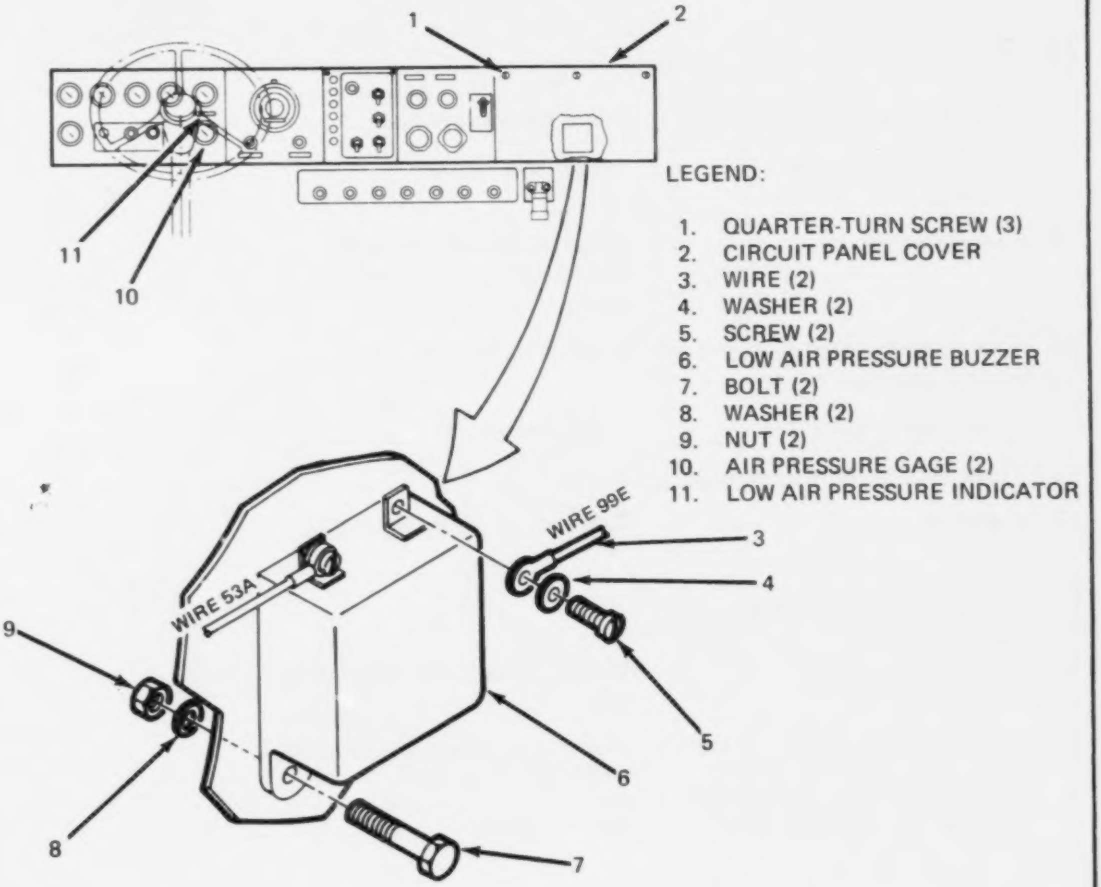
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE. (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	



LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (2)
4. WASHER (2)
5. SCREW (2)
6. LOW AIR PRESSURE BUZZER
7. BOLT (2)
8. WASHER (2)
9. NUT (2)
10. AIR PRESSURE GAGE (2)
11. LOW AIR PRESSURE INDICATOR

TA 074830

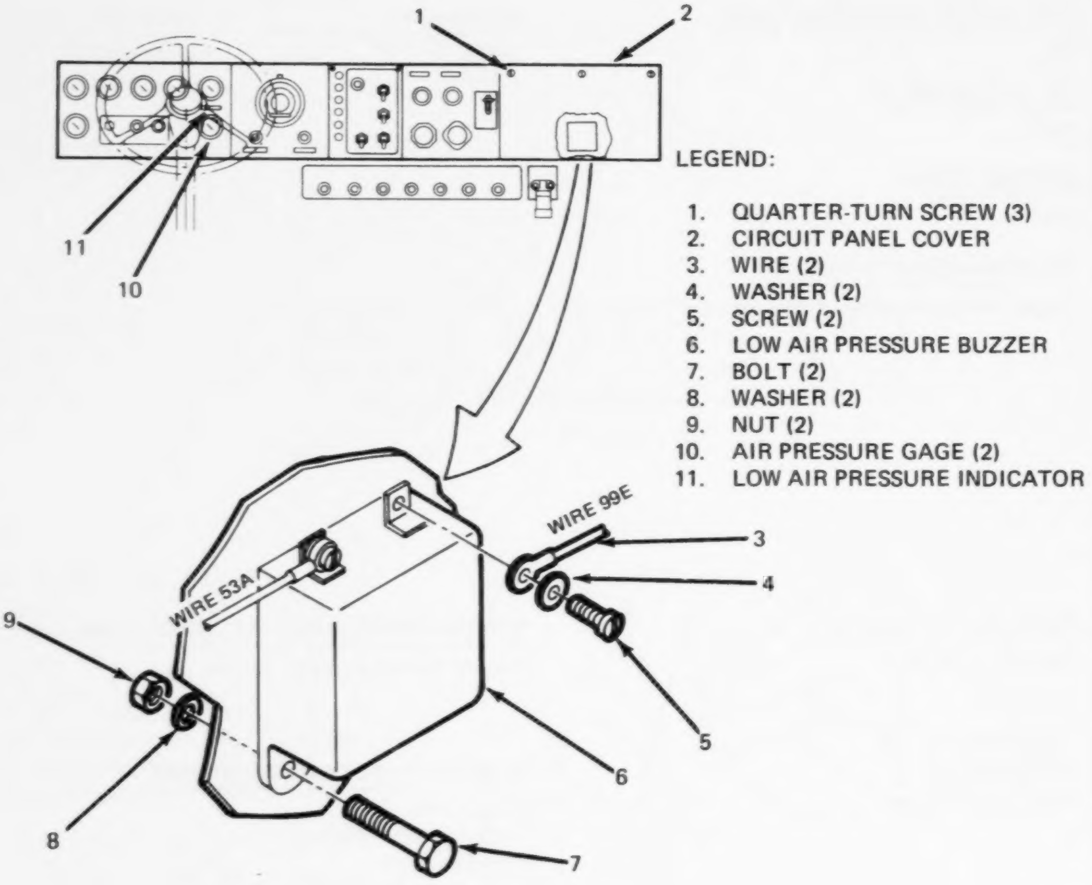
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (5) washers (4).	Remove.	
4. Two wires (3).	Remove.	
5. Two bolts (7) washers (8) and nuts (9).	Remove.	
6. Low air pressure buzzer (6).	Remove.	
B. INSTALLATION.		
7. Low air pressure buzzer (6).	Aline mounting holes.	
8. Two bolts (7), washers (8), and nuts (9).	Install and tighten.	
9. Two wires (3).	Place on low air pressure buzzer (6) according to figure.	
10. Two washers (4) and screws (5).	Install and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. Two AIR PRESSURE GAGES (10), LOW AIR PRESSURE INDICATOR (11), LOW AIR PRESSURE BUZZER (6).	Verify that gages indicate LOW PRESSURE, indicator lamp comes ON, and buzzer is ACTIVATED.	

5-80. LOW AIR PRESSURE BUZZER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (2)
4. WASHER (2)
5. SCREW (2)
6. LOW AIR PRESSURE BUZZER
7. BOLT (2)
8. WASHER (2)
9. NUT (2)
10. AIR PRESSURE GAGE (2)
11. LOW AIR PRESSURE INDICATOR

TA 074831

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(9)
b. Installation.	(10)
c. Operational Check.	(6)
	25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-6.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

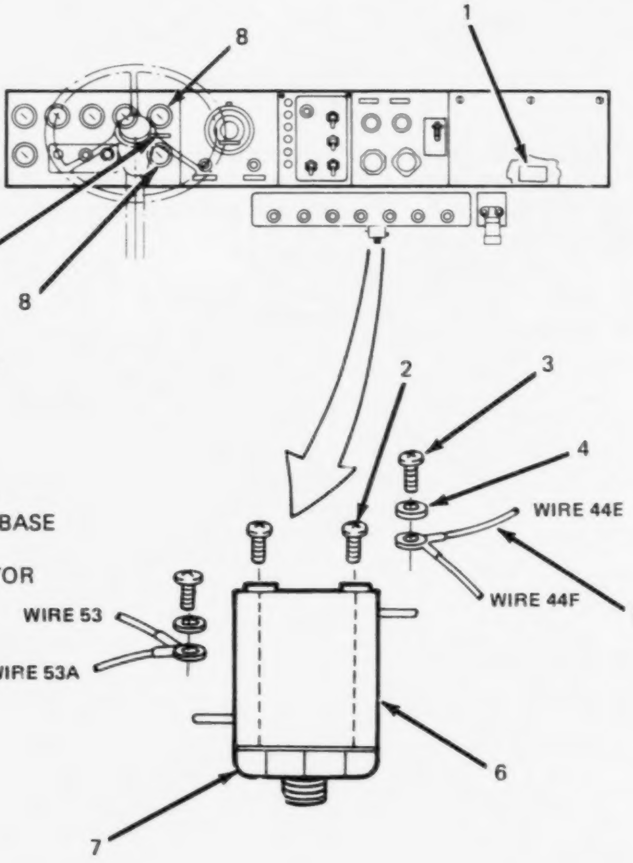
LOCATION/ITEM	ACTION	REMARKS

NOTE

Switch is located on firewall.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two screws (3), washers (4) and four wires (5).	Remove.	
2. Two screws (2).	Remove.	
3. Low air pressure switch (6).	Remove.	
4. Low air pressure switch base (7).	Remove.	



LEGEND:

1. LOW AIR PRESSURE BUZZER
2. SCREW (2)
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. LOW AIR PRESSURE SWITCH
7. LOW AIR PRESSURE SWITCH BASE
8. AIR PRESSURE GAGE (2)
9. LOW AIR PRESSURE INDICATOR

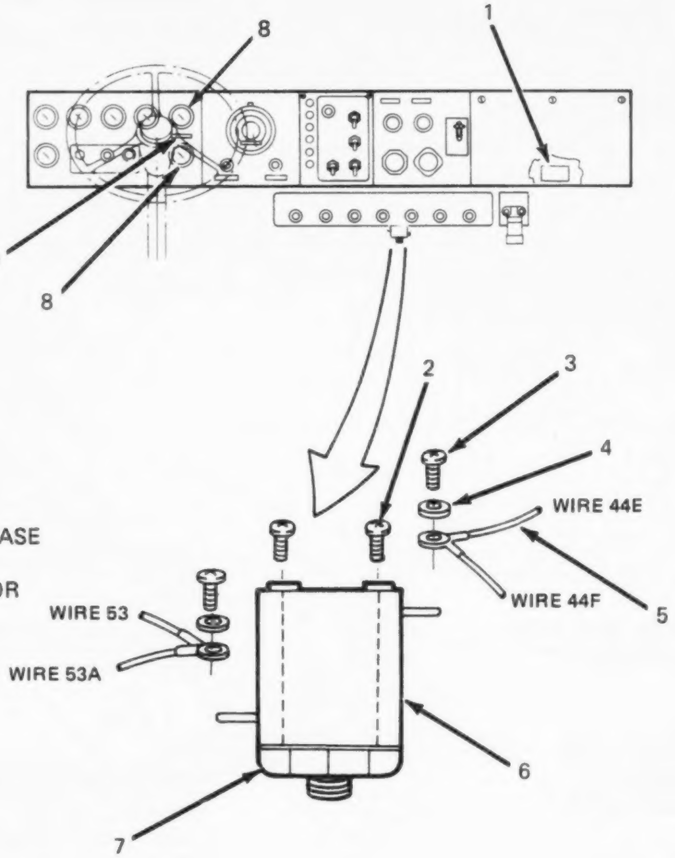
TA 074832

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Low air pressure switch base (7).	Coat threads with liquid teflon. Install and tighten.	
6. Low air pressure switch (6).	Aline and install on base (7).	
7. Two screws (2).	Install and tighten.	
8. Four wires (5), two washers (4) and screws (3).	Install and tighten.	
9. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. LOW AIR PRESSURE gages (8), LOW AIR PRESSURE indicator (9) and low air pressure buzzer (1).	Verify that gages indicate low pressure, indicator lamp comes ON, and buzzer is activated.	

5-81. LOW AIR PRESSURE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


8
1
9
8
2
3
4
WIRE 44E
WIRE 44F
5
WIRE 53
WIRE 53A
6
7

LEGEND:

1. LOW AIR PRESSURE BUZZER
2. SCREW (2)
3. SCREW (2)
4. WASHER (2)
5. WIRE (4)
6. LOW AIR PRESSURE SWITCH
7. LOW AIR PRESSURE SWITCH BASE
8. AIR PRESSURE GAGE (2)
9. LOW AIR PRESSURE INDICATOR

TA 074833

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-82. PARK BRAKE SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(3)
b. Installation.	(3)
c. Operational Check.	(5)
	11 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

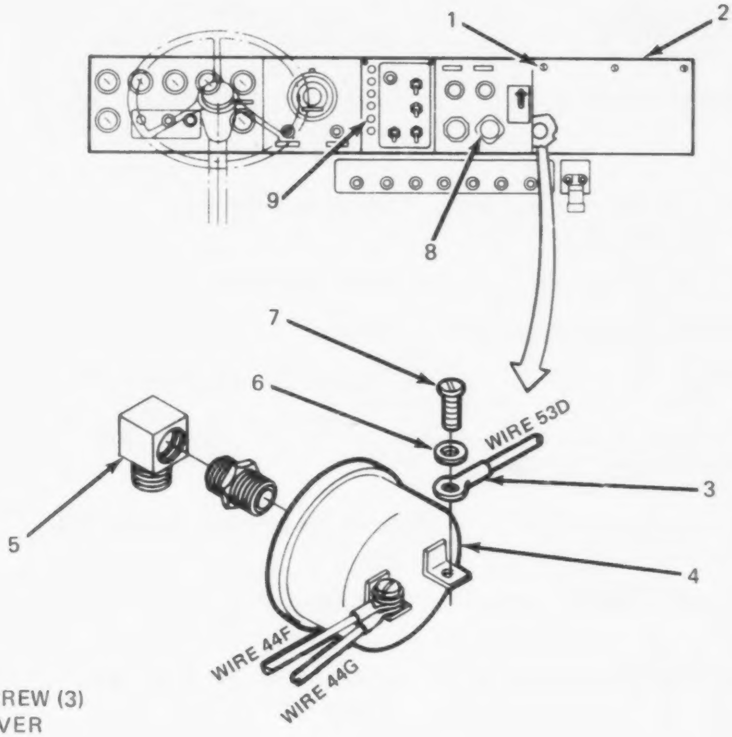
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

5-82. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	



LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (3)
4. PARK BRAKE SWITCH
5. ADAPTER
6. WASHER (2)
7. SCREW (2)
8. PARKING BRAKE CONTROL
9. PARK BRAKE INDICATOR

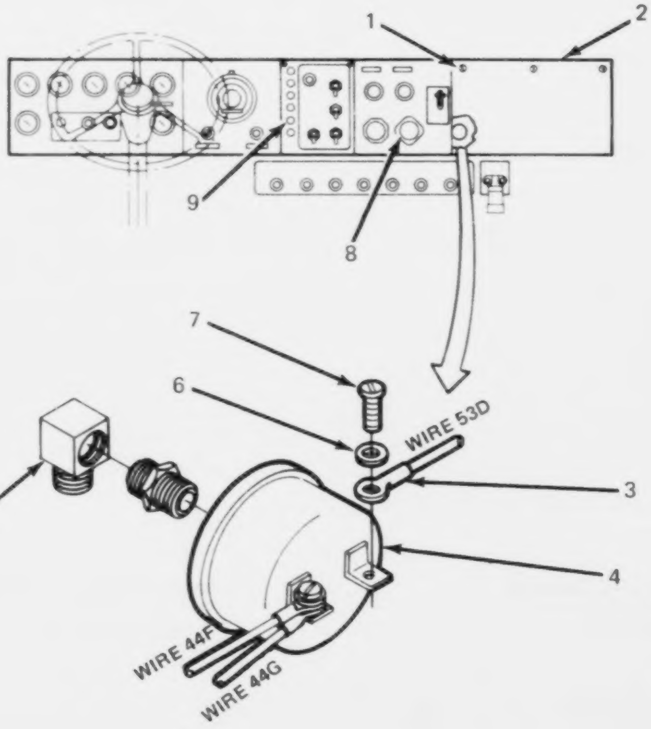
TA 074834

5-82. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two screws (7) and washers (6).	Remove.	
4. Three wires (3).	Remove.	
5. Park brake switch (4).	Remove from adapter (5).	
B. INSTALLATION.		
6. Park brake switch (4).	Coat threads with liquid teflon. Install and tighten into adapter (5).	
7. Three wires (3), two washers (6) and screws (7).	Install and tighten.	
8. Circuit panel cover (2).	Raise into place.	
9. Three quarter-turn screws (1).	Tighten.	
10. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK		
11. Engine.	Start up (see TM 9-2320-273-10).	
12. PARKING BRAKE control (8).	Pull ON.	
13. PARK BRAKE indicator (9).	Observe that indicator lamp comes ON.	

5-82. PARK BRAKE SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
9
8
7
6
WIRE 53D
5
3
4
WIRE 44F
WIRE 44G

LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (3)
4. PARK BRAKE SWITCH
5. ADAPTER
6. WASHER (2)
7. SCREW (2)
8. PARKING BRAKE CONTROL
9. PARK BRAKE INDICATOR

TA 074835

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(3)
b. Installation.	(3)
c. Operational Check.	(2)
	8 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-23202-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

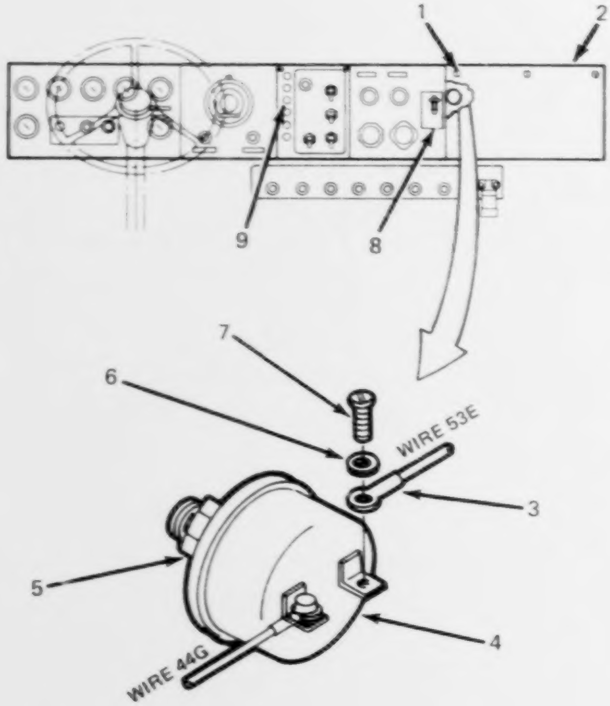
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF
Transmission in Neutral
Park Brake Set.

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	
3. Two screws (7) and washers (6).	Remove.	
4. Two wires (3).	Remove.	
5. Differential lock-up switch (4).	Remove.	
6. Hex nut (5).	Remove.	



LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (2)
4. DIFFERENTIAL LOCK-UP SWITCH
5. HEX NUT
6. WASHER (2)
7. SCREW (2)
8. DIFFERENTIAL LOCK-UP CONTROL
9. DIFFERENTIAL LOCK-UP INDICATOR

TA 074836

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE (Continued).

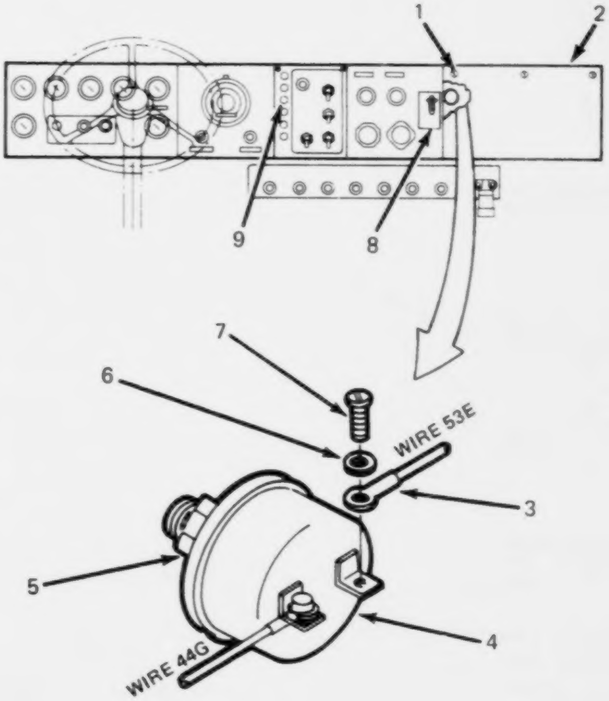
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
7. Hex nut (5).	Install on differential lock-up switch (4).	
8. Differential lock-up switch (4).	Coat threads with liquid teflon. Install and tighten.	
9. Hex nut (5).	Tighten.	
10. Two wires (3), washers (6) screws (7).	Install and tighten.	
11. Circuit panel cover (2).	Raise into place.	
12. Three quarter-turn screws (1).	Tighten.	
13. Batteries.	Connect per paragraph 5-37B.	
C. OPERATIONAL CHECK.		
14. Engine.	Start up (see TM 9-2320-273-10).	
15. DIFFERENTIAL LOCK-UP control (8).	Set to LOCK.	
16. DIFFERENTIAL LOCK-UP indicator (9).	Observe that indicator lamp comes on.	

5-83. DIFFERENTIAL LOCK-UP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. WIRE (2)
4. DIFFERENTIAL LOCK-UP SWITCH
5. HEX NUT
6. WASHER (2)
7. SCREW (2)
8. DIFFERENTIAL LOCK-UP CONTROL
9. DIFFERENTIAL LOCK-UP INDICATOR



TA 074837

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-84. POWER TAKEOFF(PTO) SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

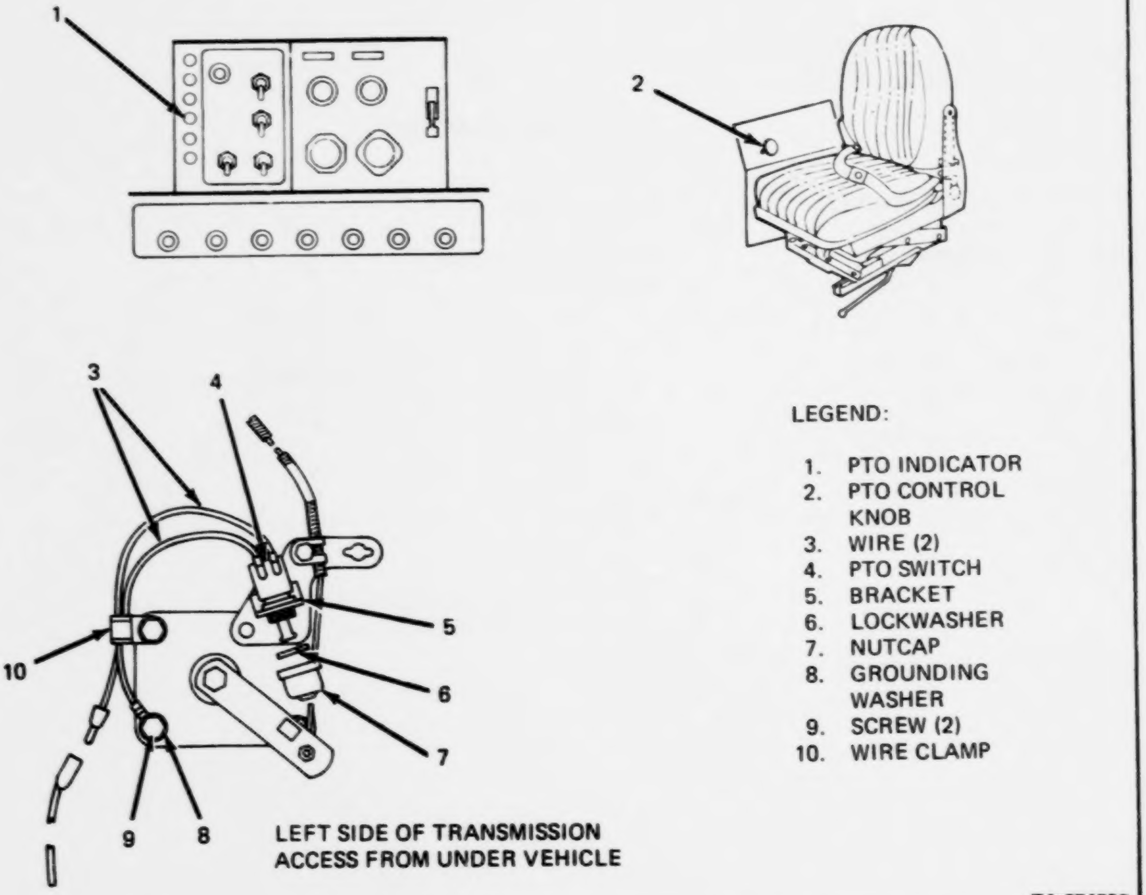
TROUBLESHOOTING REFERENCES

Table 12-2.

5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Nutcap (7) and lockwasher (6).	Remove.	
2. Two screws (9), grounding washer (8) and wire clamp (10).	Remove with two wires (3).	



LEGEND:

1. PTO INDICATOR
2. PTO CONTROL KNOB
3. WIRE (2)
4. PTO SWITCH
5. BRACKET
6. LOCKWASHER
7. NUTCAP
8. GROUNDING WASHER
9. SCREW (2)
10. WIRE CLAMP

LEFT SIDE OF TRANSMISSION
ACCESS FROM UNDER VEHICLE

TA 074838

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

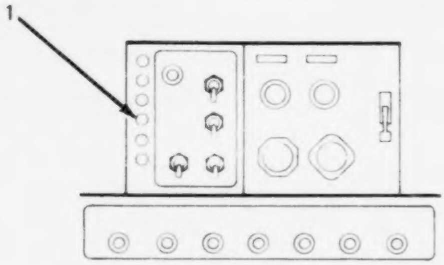
5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).

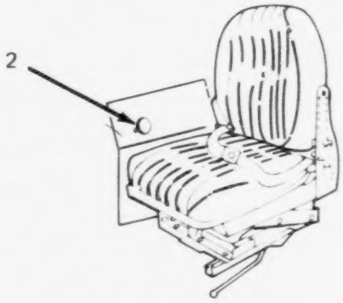
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. PTO switch (4).	Remove from bracket (5).	
B. INSTALLATION.		
4. PTO switch (4).	Install on bracket (5).	
5. Lockwasher (6) and nutcap (7).	Install and tighten.	
6. Two wires (3).	Install on PTO switch (4).	
7. Two screws (9), grounding washer (8) and wire clamp (10).	Install to PTO.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	
9. PTO control knob (2).	Pull to engage.	
10. PTO indicator (1).	Observe that indicator lamp comes ON.	

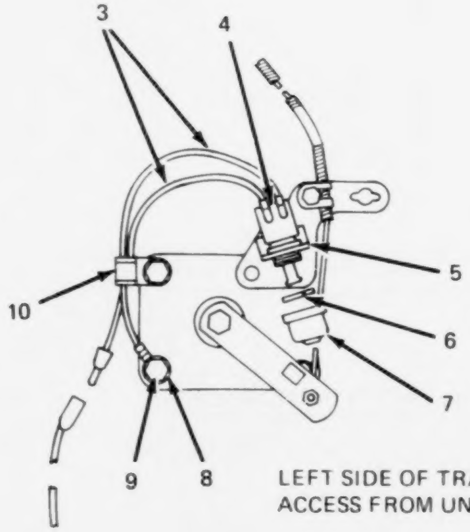
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-84. POWER TAKEOFF (PTO) SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS







LEFT SIDE OF TRANSMISSION
ACCESS FROM UNDER VEHICLE

LEGEND:

1. PTO INDICATOR
2. PTO CONTROL KNOB
3. WIRE (2)
4. PTO SWITCH
5. BRACKET
6. LOCKWASHER
7. NUTCAP
8. GROUNDING WASHER
9. SCREW (2)
10. WIRE CLAMP

TA 074839

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation.	(2)
c. Operational Check.	(1)
	5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-11.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

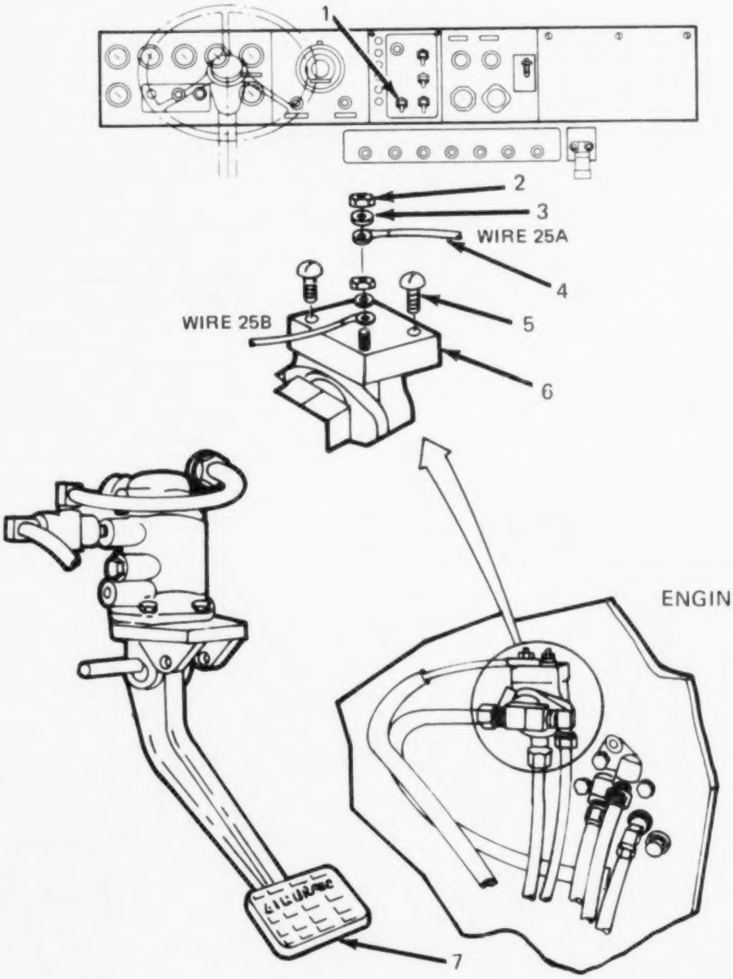
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two nuts (2) and washers (3).	Remove.	
2. Two wires (4).	Remove.	
3. Two screws (5).	Remove.	
4. Stoplamp switch (6).	Remove.	


1
2
3
WIRE 25A
4
WIRE 25B
5
6
LEFT SIDE ENGINE COMPARTMENT FIRE WALL
7

LEGEND:

1. OPERATION SWITCH
2. NUT (2)
3. WASHER (2)
4. WIRE (2)
5. SCREW (2)
6. STOPLAMP SWITCH
7. BRAKE PEDAL

TA 074840

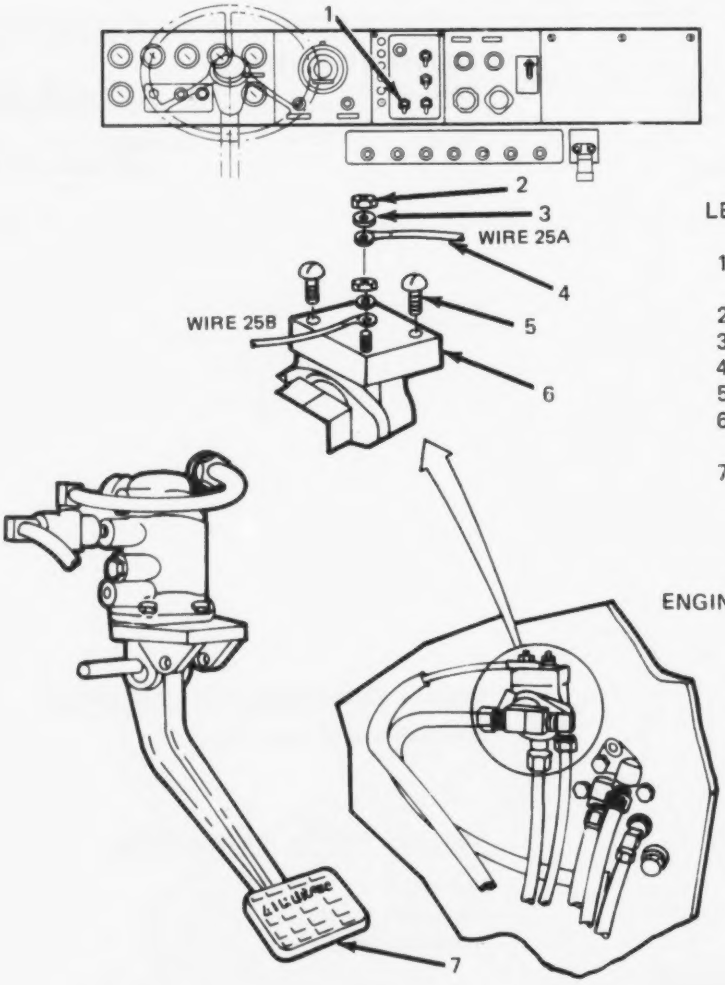
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Stoplamp switch (6).	Aline and install.	
6. Two screws (5).	Install and tighten.	
7. Two wires (4), washers (3) and nuts (2).	Install and tighten.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10).	
9. OPERATION switch (1).	Set to NORMAL.	
10. BRAKE pedal (7).	Press DOWN.	First mechanic.
11. BRAKE lamps.	Verify that brake lamps come ON.	Second mechanic.

5-85. STOPLAMP SWITCH MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. OPERATION SWITCH
2. NUT (2)
3. WASHER (2)
4. WIRE (2)
5. SCREW (2)
6. STOPLAMP SWITCH
7. BRAKE PEDAL

LEFT SIDE
ENGINE COMPARTMENT
FIRE WALL

TA 074841

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-86. INSTRUMENT RELAY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(2)
b. Installation.	(2)
c. Operational Check.	(1)
	5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

1. M917, M918, M919 – Two Relays.
2. M915 – Seven Relays.
3. M916 and M920 – Eight Relays.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

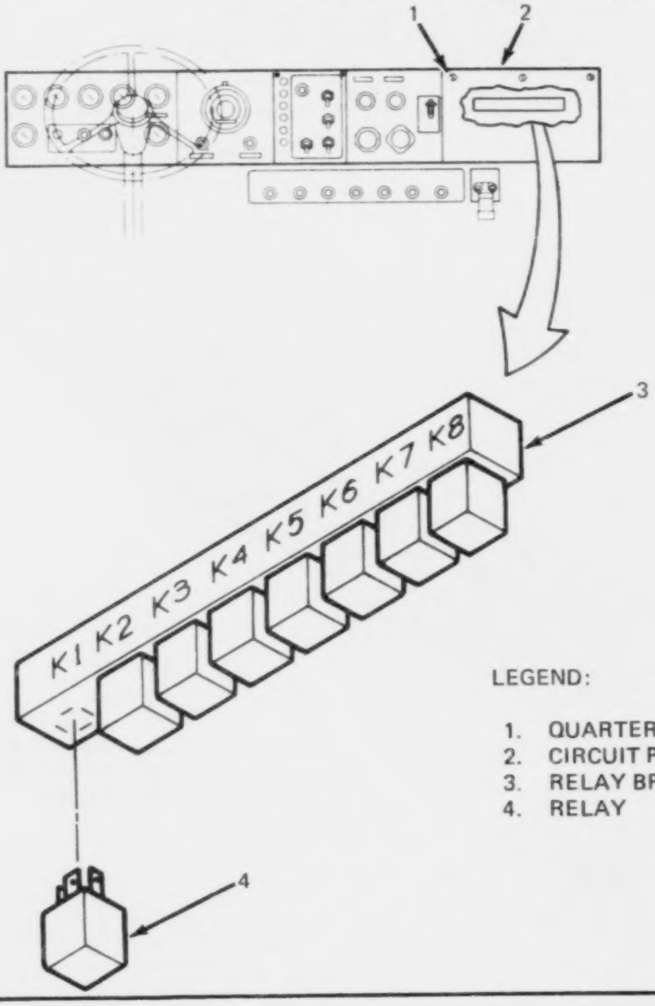
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-86. INSTRUMENT RELAY MAINTENANCE

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Circuit panel cover (2).	Lower.	
3. Relay (4).	Remove from relay bracket (3).	
B. INSTALLATION.		
4. Relay (4).	Aline and press into relay bracket (3).	



LEGEND:

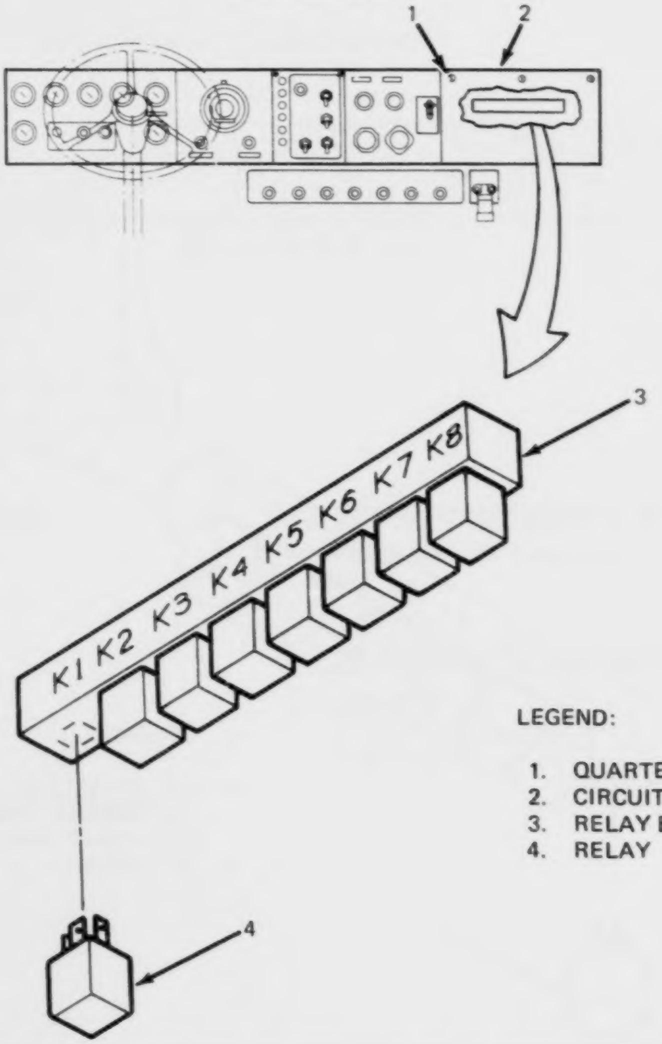
1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. RELAY BRACKET
4. RELAY

TA 074842

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-86. INSTRUMENT RELAY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
5. Circuit panel cover (2).	Raise into place.	
6. Three quarter-turn screws (1).	Tighten.	
C. OPERATIONAL CHECK.		
7. Relay.	Refer to paragraph 2-34 and check the operation of the relay replaced.	



LEGEND:

1. QUARTER-TURN SCREW (3)
2. CIRCUIT PANEL COVER
3. RELAY BRACKET
4. RELAY

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Circuit Breaker (ea).	(15)	d. Removal of Circuit Breaker Box and Receptacle.	(60)
b. Installation of Circuit Breaker (ea).	(15)	e. Installation of Circuit Breaker Box and Receptacle.	(60)
c. Operational Check.	(15)	f. Operational Check.	(30)
			195 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

30 Amp Circuit Breaker (1).
15 Amp Circuit Breaker (3).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to OFF.

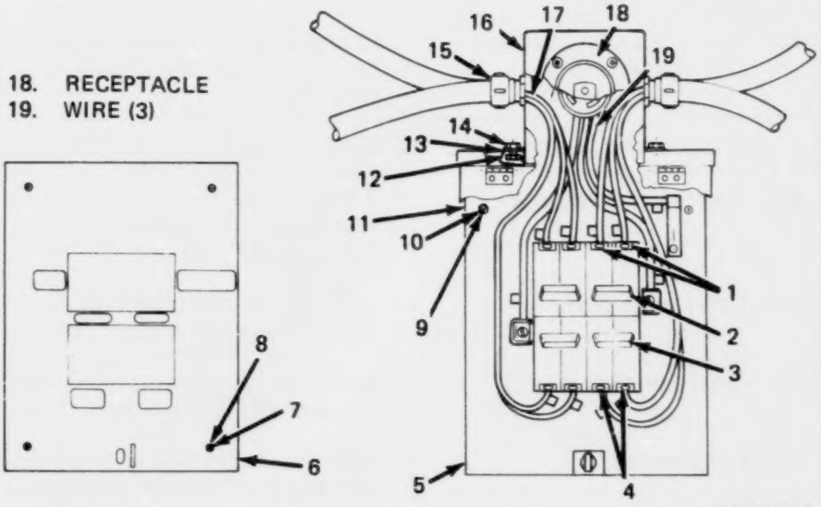
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF CIRCUIT BREAKER.		
1. Four screws (7) and washers (8).	Remove and lift out inner panel (6).	Open outer cover to gain access to (6), (7), and (8).
2. Two screws (1) or (4).	Remove and lift off wires.	Screws (1) if 15 amp breaker; screws (4) if 30 amp breaker. Mark wires for location.
3. Circuit breaker (2) or (3).	Remove by pulling out.	Circuit breakers are the plug in type. Item (2) 15 amp; Item (3) 30 amp.
B. INSTALLATION OF CIRCUIT BREAKER.		
4. Circuit breaker (2) or (3).	Install by pushing into position.	Be sure breaker is securely snapped in.
5. Two screws (1) or (4).	Place wires into position on circuit breaker and secure with screws.	Be sure to reattach wires as marked in step 2.
6. Inner panel (6).	Set into position in box (5) and attach with four screws (7) and washers (8).	

LEGEND:

1. SCREW (2)
2. CIRCUIT BREAKER (3)
3. CIRCUIT BREAKER
4. SCREW (2)
5. BOX
6. INNER PANEL
7. SCREW (4)
8. WASHER (4)
9. BOLT (3)
10. WASHER (3)
11. NUT (3)
12. NUT (4)
13. WASHER (4)
14. BOLT (4)
15. CONNECTOR (4)
16. RECEPTACLE BOX
17. WIRE (8)
18. RECEPTACLE
19. WIRE (3)



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5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
7. Receptacle (18).	Plug in 110 VAC power cord.	
8. Circuit breaker (2) or (3).	Flip replaced breaker to ON and verify that appropriate heater is functional.	After verifying proper heater functions, flip all breakers to OFF and disconnect power cord.
D. REMOVAL OF CIRCUIT BREAKER BOX AND RECEPTACLE.		
9. Breaker box (5).	Open outer cover, remove four washers (8) and screws (7) and inner panel (6) to gain access to box attaching hardware.	
10. Four cable to receptacle box connectors (15).	Unscrew.	
11. Six screws (1) and two screws (4).	Unscrew and remove eight wires (17).	Mark each wire and pull wire out of receptacle box.
12. Three bolts (9) with washers (10) and nuts (11).	Unscrew and remove circuit breaker box (5) with receptacle box (16) attached.	
13. Receptacle (18).	Remove retaining screws.	
14. Three wires (19).	Disconnect from receptacle (18) and remove receptacle.	Mark position before disconnecting.
15. Four bolts (14), washers (13) and nuts (12).	Unscrew and remove receptacle box (16) from circuit breaker box (5).	
E. INSTALLATION OF CIRCUIT BREAKER BOX AND RECEPTACLE.		
16. Receptacle box (16).	Attach to circuit box (5) with four bolts (14), washers (13) and nuts (12).	
17. Three wires (19).	Connect to receptacle (18) and install receptacle to box (16).	
18. Circuit breaker box (5).	Mount to vehicle with three bolts (9), washers (10) and nuts (11).	
19. Eight wires (17).	Push thru either side of receptacle box and fasten to circuit breakers as marked, with six screws (1) and two screws (4).	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

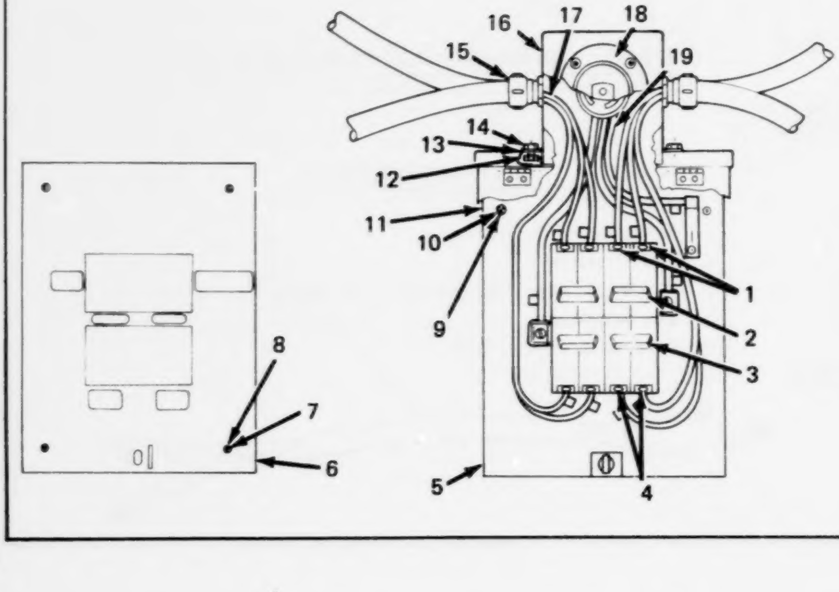
5-87. WINTERIZATION KIT CIRCUIT BREAKERS, BOX, AND RECEPTACLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. INSTALLATION OF CIRCUIT BREAKER BOX AND RECEPTACLE (Continued).		
20. Four cable connectors (15).	Screw onto receptacle box (16).	
21. Inner panel (6).	Fasten to box (5) with four screws (7) and washers (8).	Insure all breakers are OFF.
F. OPERATIONAL CHECK.		
22. Receptacle (18).	Plug in 110 VAC power cord.	
23. Four circuit breakers (2) and (3).	Flip to ON and verify that all four heaters are functioning.	
24. Four circuit breakers (2) and (3).	Flip to OFF, disconnect power cord and close outer cover on circuit breaker box (5).	

NOTE

Follow-on maintenance action required:

Connect 12 VDC vehicle batteries per para 5-37B.



LEGEND:

1. SCREW (2)
2. CIRCUIT BREAKER (3)
3. CIRCUIT BREAKER
4. SCREW (2)
5. BOX
6. INNER PANEL
7. SCREW (4)
8. WASHER (4)
9. BOLT (3)
10. WASHER (3)
11. NUT (3)
12. NUT (4)
13. WASHER (4)
14. BOLT (4)
15. CONNECTOR (4)
16. RECEPTACLE BOX
17. WIRE (8)
18. RECEPTACLE
19. WIRE (3)

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Transmission Oil Heater.	(30)
b. Installation of Transmission Oil Heater.	(30)
c. Operational Check.	(15)
	75 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
6-9A.	Transmission Oil Drained.
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to OFF.

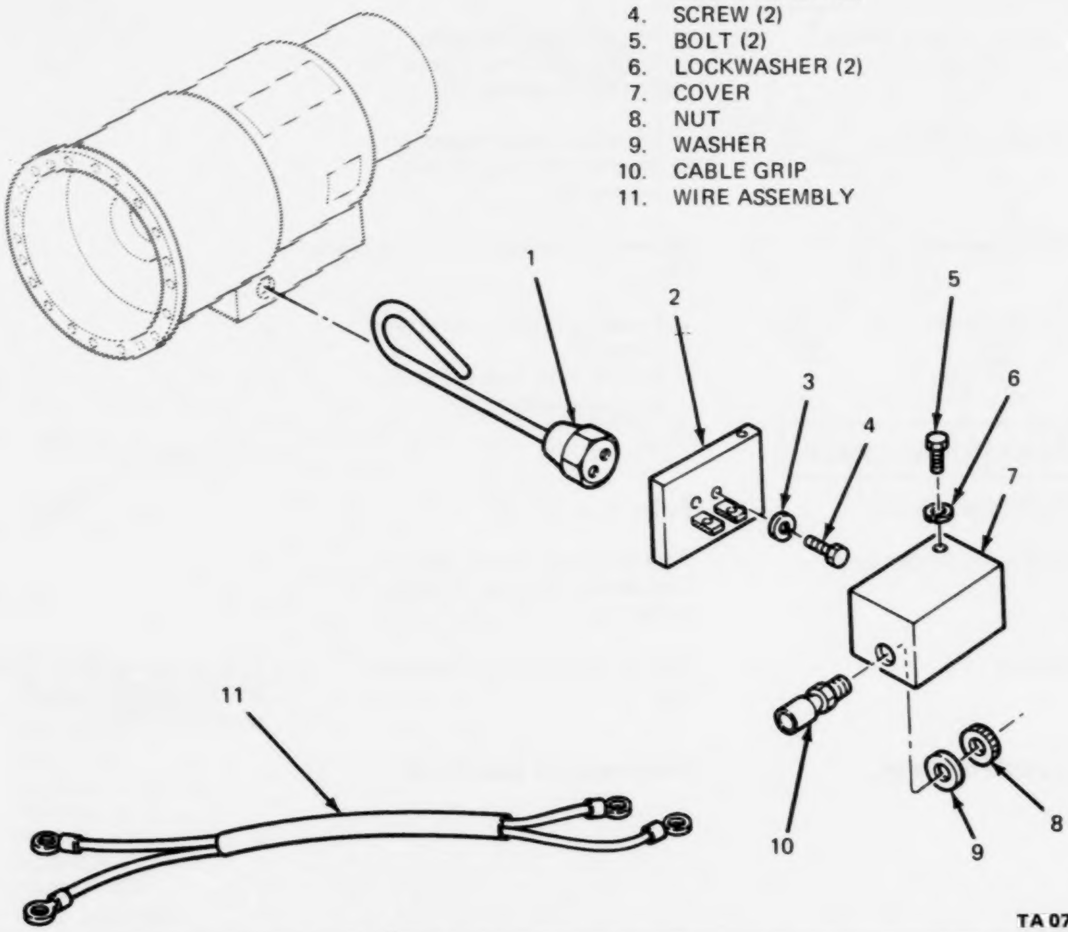
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF HEATER.		
1. Heater cover (7).	a. Remove two bolts (5) and lockwashers (6). b. Remove heater cover (7) from heater mounting plate (2).	
2. Wire assembly (11).	Remove from heater mounting plate (2).	

LEGEND:

1. HEATER
2. HEATER MOUNTING PLATE
3. LOCKWASHER (2)
4. SCREW (2)
5. BOLT (2)
6. LOCKWASHER (2)
7. COVER
8. NUT
9. WASHER
10. CABLE GRIP
11. WIRE ASSEMBLY



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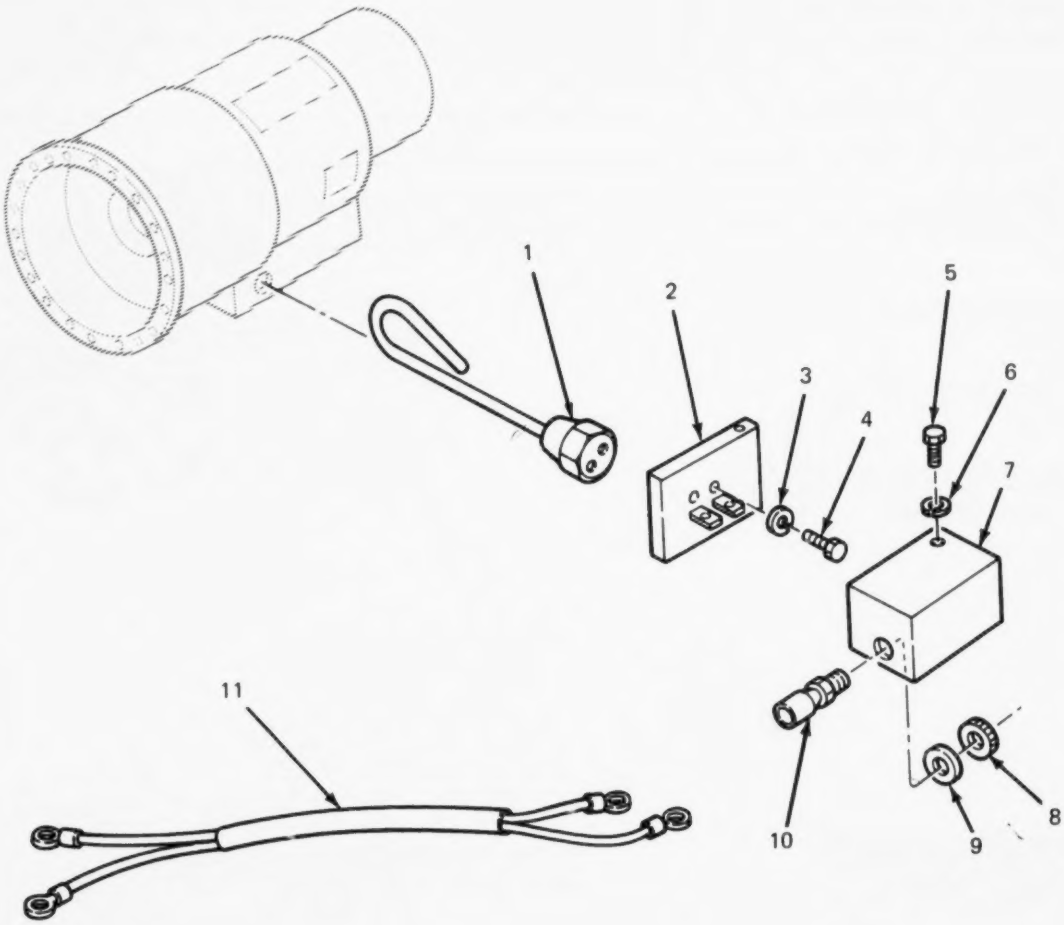
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF HEATER (Continued).		
3. Cable grip (10).	a. Remove nut (8) and washer (9). b. Remove cable grip (10) from heater cover (7).	
4. Heater mounting plate (2) and heater (1).	a. Remove two screws (4) and lockwashers (3). b. Remove heater mounting plate (2) and heater (1) from transmission.	
B. INSTALLATION OF HEATER.		
5. Heater (1) and heater mounting plate (2).	a. Install in transmission. b. Secure with two screws (4) and lockwashers (3).	
6. Cable grip (10).	a. Install in heater cover (7). b. Secure with nut (8) and washer (9).	
7. Wire assembly (11).	Connect to heater mounting plate (2).	
8. Heater cover (7).	a. Install on heater mounting plate (2). b. Secure with two bolts (5) and lockwashers (6).	
C. OPERATIONAL CHECK.		
9. Refill transmission.	Refer to para 6-9E.	
10. 110 VAC power cord.	Plug into source and vehicle receptacle, flip transmission heater circuit breaker to ON.	
11. Heater (1).	Verify that heater is functioning.	Flip circuit breaker OFF and disconnect power cord after check.
12. Vehicle batteries.	Reconnect per para 5-37B.	

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-88. WINTERIZATION KIT TRANSMISSION OIL HEATER MAINTENANCE (Continued).



LEGEND:

1. HEATER
2. HEATER MOUNTING PLATE
3. LOCKWASHER (2)
4. SCREW (2)
5. BOLT (2)
6. LOCKWASHER (2)
7. COVER
8. NUT
9. WASHER
10. CABLE GRIP
11. WIRE ASSEMBLY

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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Thermostat .	(30)
b. Installation of Thermostat .	(30)
c. Operational Check .	(15)
	75 Minutes Total .

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Gasket (1020803).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-14A.	Engine Oil Drained.
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

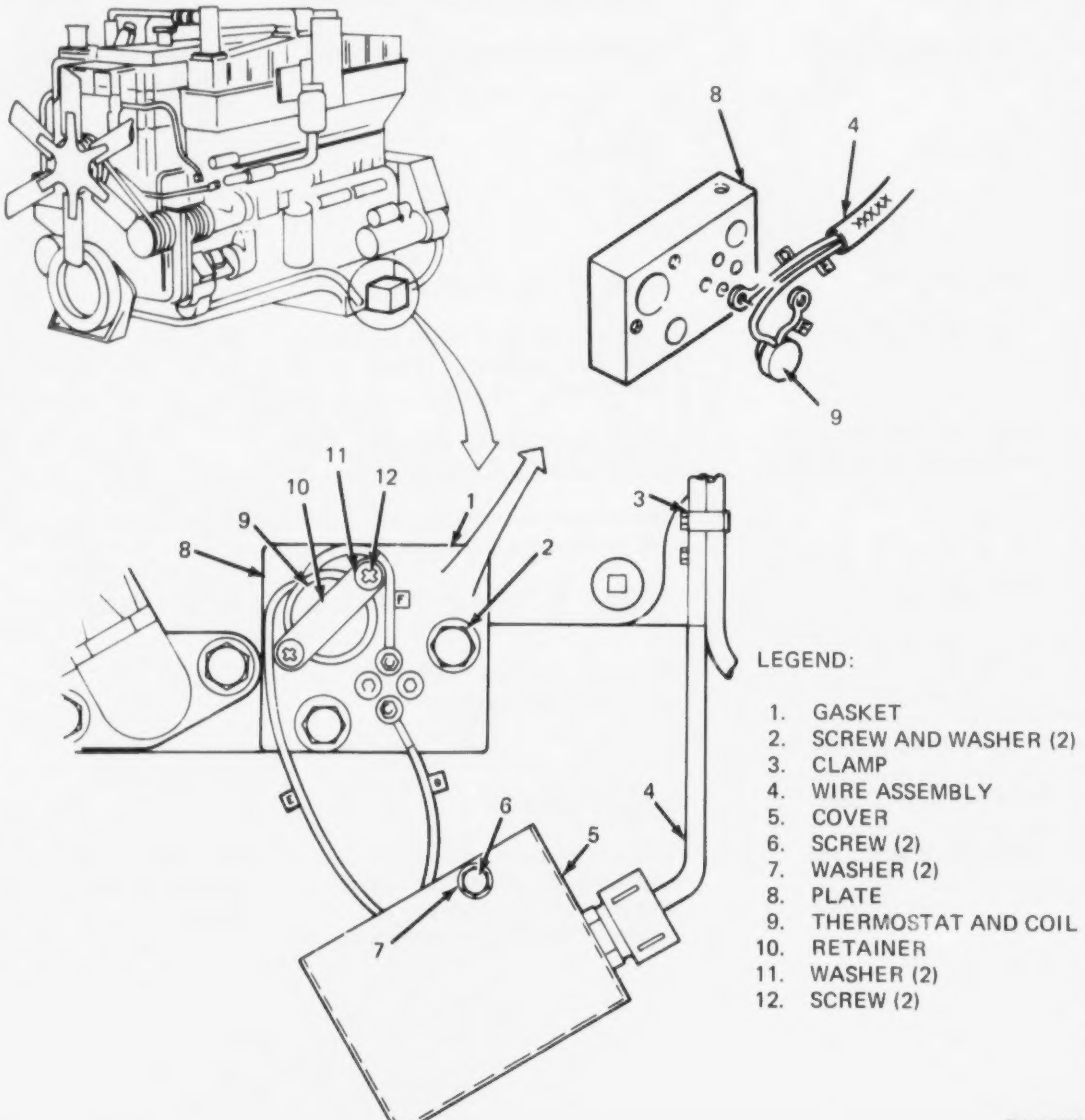
Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to Off.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

A. REMOVAL OF THERMOSTAT.

LOCATION/ITEM	ACTION	REMARKS
1. Two screws (6) and washers (7).	Unscrew and remove cover (5).	
2. Wire assembly (4).	Disconnect from terminals on plate (8).	Mark locations.



LEGEND:

1. GASKET
2. SCREW AND WASHER (2)
3. CLAMP
4. WIRE ASSEMBLY
5. COVER
6. SCREW (2)
7. WASHER (2)
8. PLATE
9. THERMOSTAT AND COIL
10. RETAINER
11. WASHER (2)
12. SCREW (2)

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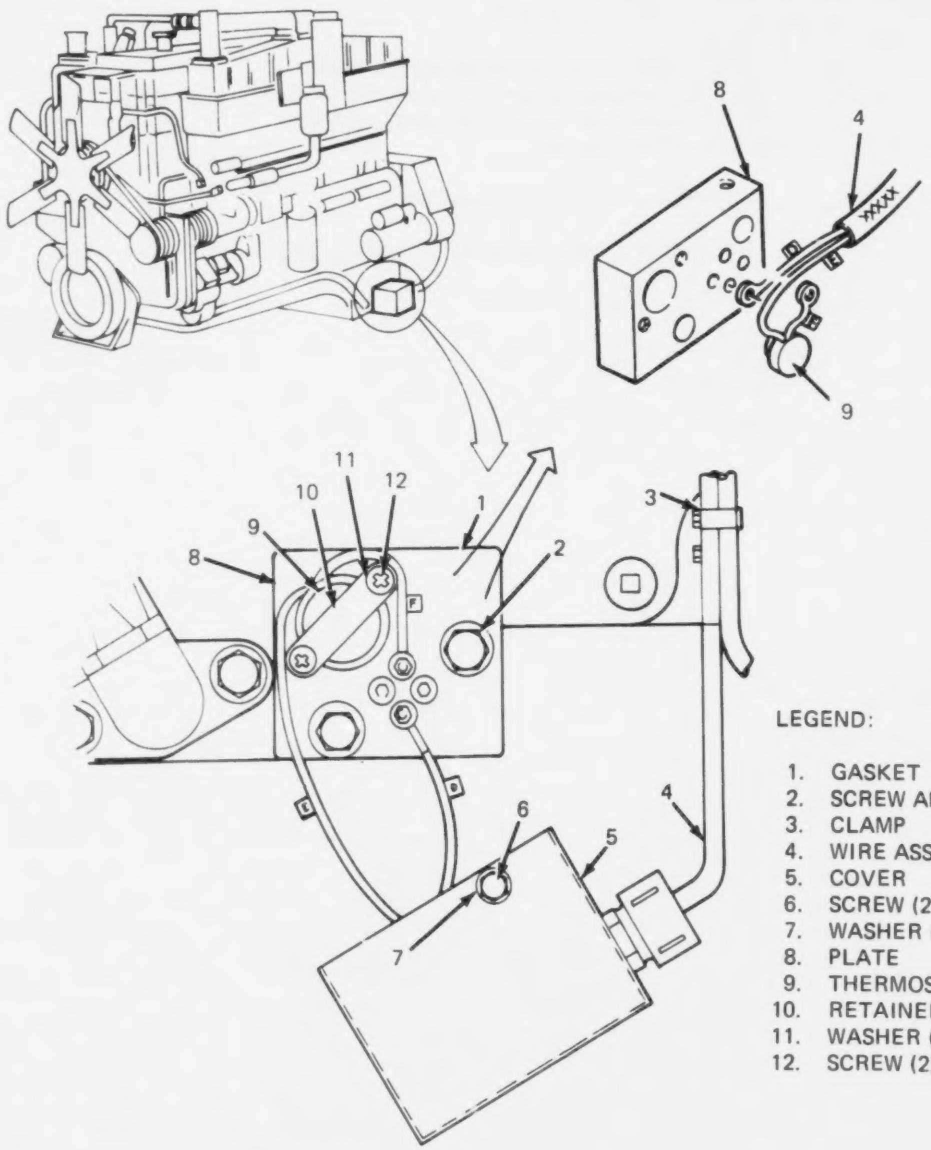
5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF THERMOSTAT (Continued).		
3. Clamp (3)	Remove from transmission front by taking out one screw.	Remove if wire assembly is to be disconnected at circuit breaker box.
4. Two screws (2) with washers.	Remove and lift off plate (8) with thermostat and coil (9) attached.	
5. Two screws (12) and washers (11).	Unscrew to remove retainer (10).	Lift out thermostat and coil (9). Replace as necessary.
6. Gasket (1).	Remove.	Discard.
B. INSTALLATION OF THERMOSTAT.		
7. New gasket (1).	Install to side of oil pan.	
8. Thermostat and coil (9).	Install to plate (8) with retainer (10), two washers (11) and two screws (12).	
9. Plate (8) with coil and thermostat (9) attached.	Mount over gasket with two screws (2) and washers.	
10. Clamp (3).	Install over wire assembly (4) at transmission front.	If removed.
11. Wire assembly (4).	Connect to heater terminals on plate (8).	Install as marked.
12. Cover (5).	Install on plate (8) with two screws (2) and washers.	
C. OPERATIONAL CHECK.		
13. Refill engine oil pan.	Refer to para 4-14.	
14. 110 VAC power cord.	Plug into source and vehicle receptacle, flip engine oil circuit breaker ON and verify that heater is functioning properly.	Flip breaker to OFF and remove power cord after check.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. GASKET
2. SCREW AND WASHER (2)
3. CLAMP
4. WIRE ASSEMBLY
5. COVER
6. SCREW (2)
7. WASHER (2)
8. PLATE
9. THERMOSTAT AND COIL
10. RETAINER
11. WASHER (2)
12. SCREW (2)

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SENDING UNITS, SWITCHING DEVICES AND WINTERIZATION KIT.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued)

LOCATION/ITEM	ACTION	REMARKS

C. OPERATIONAL CHECK (continued).

NOTE

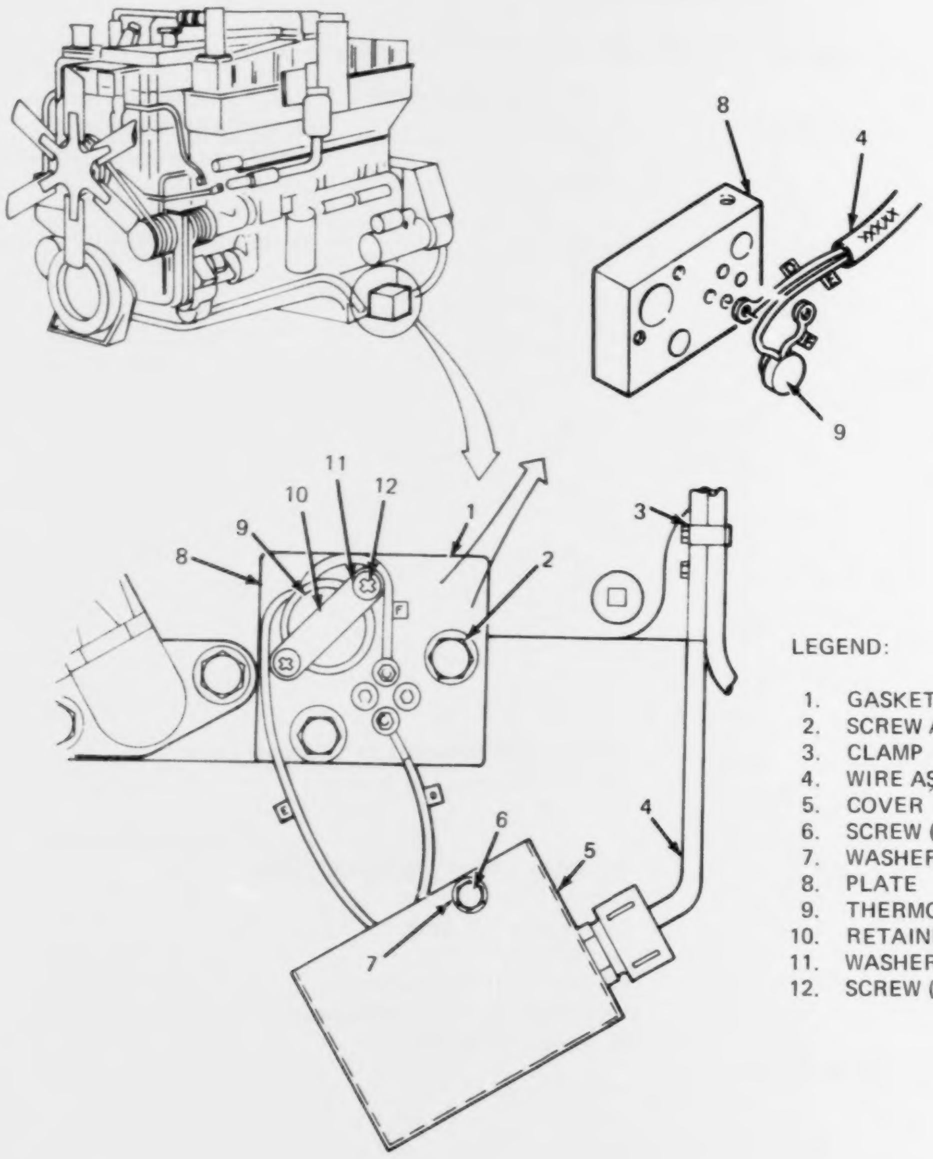
If after thermostat maintenance the heater does not function properly, refer to DS/GS as the oil pan will have to be removed for service of the heater.

Follow-on maintenance required:

Reconnect vehicle batteries per para 5-37B.

5-89. WINTERIZATION KIT ENGINE OIL HEATER THERMOSTAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. GASKET
2. SCREW AND WASHER (2)
3. CLAMP
4. WIRE ASSEMBLY
5. COVER
6. SCREW (2)
7. WASHER (2)
8. PLATE
9. THERMOSTAT AND COIL
10. RETAINER
11. WASHER (2)
12. SCREW (2)

TA 075704

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Heater .	(60)
b. Installation of Heater .	(60)
c. Operational Check .	(15)
	135 Minutes Total .

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (See App C) .

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42A.	Engine Cooling System Drained.
4-25A/4-27A.	Engine Air Filter and Ducts Removed.
4-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

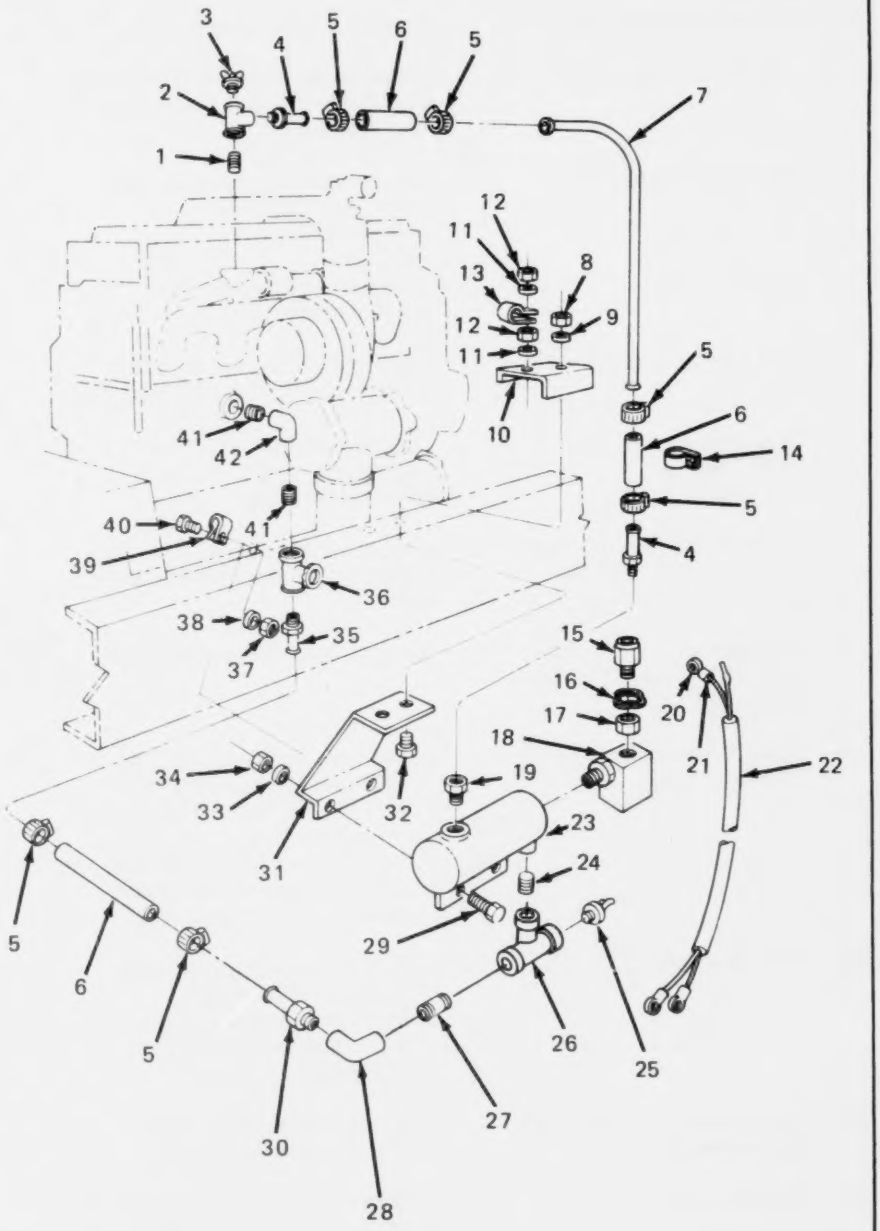
Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected
From Power Source and Receptacle.
All Breakers Set to OFF.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NIPPLE
2. TEE
3. DRAIN COCK
4. ADAPTER
5. HOSE CLAMP (6)
6. HOSE (3)
7. PIPE
8. NUT
9. LOCKWASHER
10. BRACKET
11. LOCKWASHER
12. NUT (2)
13. HARNESS CLAMP
14. HARNESS CLAMP
15. CABLE GRIP
16. WASHER
17. LOCKNUT
18. THERMOSTAT
19. BUSHING
20. TERMINAL
21. SPLICE CONNECTOR
22. WIRE ASSEMBLY
23. HEATER
24. NIPPLE
25. DRAINCOCK
26. TEE
27. NIPPLE
28. ELBOW
29. SCREW (2)
30. ADAPTER
31. SUPPORT
32. BOLT (2)
33. LOCKWASHER (2)
34. NUT (2)
35. ADAPTER
36. VALVE
37. NUT
38. LOCKWASHER
39. CLAMP
40. SCREW
41. NIPPLE (2)
42. ELBOW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TA 075705

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

A. REMOVAL.

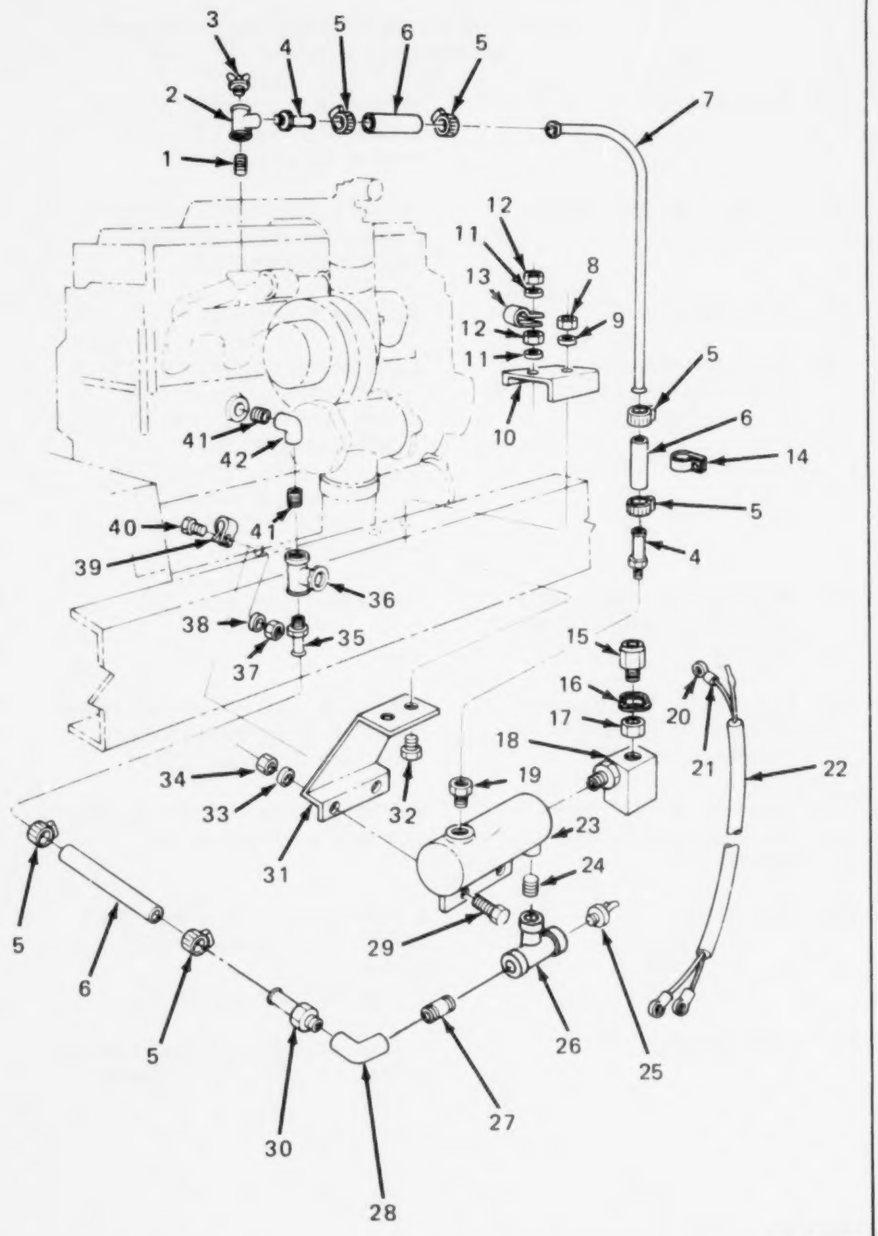
LOCATION/ITEM	ACTION	REMARKS
1. Two hose clamps (5).	Loosen and remove hose (6).	
2. Tee (2) and nipple (1).	Unscrew and remove from water manifold. Remove draincock (3) and adapter (4).	
3. Two hose clamps (5).	Loosen and remove hose (6) from pipe (7), adapter (4), and clamp (14).	
4. Bushing (19).	Unscrew and remove from rear port of heater (23).	
5. Two hose clamps (5).	Loosen and remove hose (6) from two adapters (30) and (35).	
6. Two nipples (41) and valve (36).	Unscrew and remove from engine block with elbow (42) and adapter (35).	
7. Elbow (28), two nipples (24) and (27), tee (26), and draincock (25).	Unscrew and remove from forward port on bottom of heater (23).	
8. Wire assembly (22), cable grip (15), washer (16) and locknut (17).	Remove from thermostat (18).	
9. Three harness clamps (13), (14), and (39).	a. Remove two nuts (12), bolts (32) and lockwashers (11) and remove harness clamps (13) and (14). b. Remove nut (37), bolt (40) and lockwasher (38) and remove harness clamp (39).	
10. Wire assembly (22).	a. Pull thru to circuit breaker if service is required. b. Replace terminals (20) or splice connectors (21) as required.	
11. Two screws (29), nuts (34) and lockwashers (33).	Unscrew and remove heater (23) and thermostat (18).	
12. Bracket (10).	Separate from support (31) by removing bolt (32), lockwasher (9), and nut (8).	

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NIPPLE
2. TEE
3. DRAIN COCK
4. ADAPTER
5. HOSE CLAMP (6)
6. HOSE (3)
7. PIPE
8. NUT
9. LOCKWASHER
10. BRACKET
11. LOCKWASHER
12. NUT (2)
13. HARNESS CLAMP
14. HARNESS CLAMP
15. CABLE GRIP
16. WASHER
17. LOCKNUT
18. THERMOSTAT
19. BUSHING
20. TERMINAL
21. SPLICE CONNECTOR
22. WIRE ASSEMBLY
23. HEATER
24. NIPPLE
25. DRAINCOCK
26. TEE
27. NIPPLE
28. ELBOW
29. SCREW (2)
30. ADAPTER
31. SUPPORT
32. BOLT (2)
33. LOCKWASHER (2)
34. NUT (2)
35. ADAPTER
36. VALVE
37. NUT
38. LOCKWASHER
39. CLAMP
40. SCREW
41. NIPPLE (2)
42. ELBOW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5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

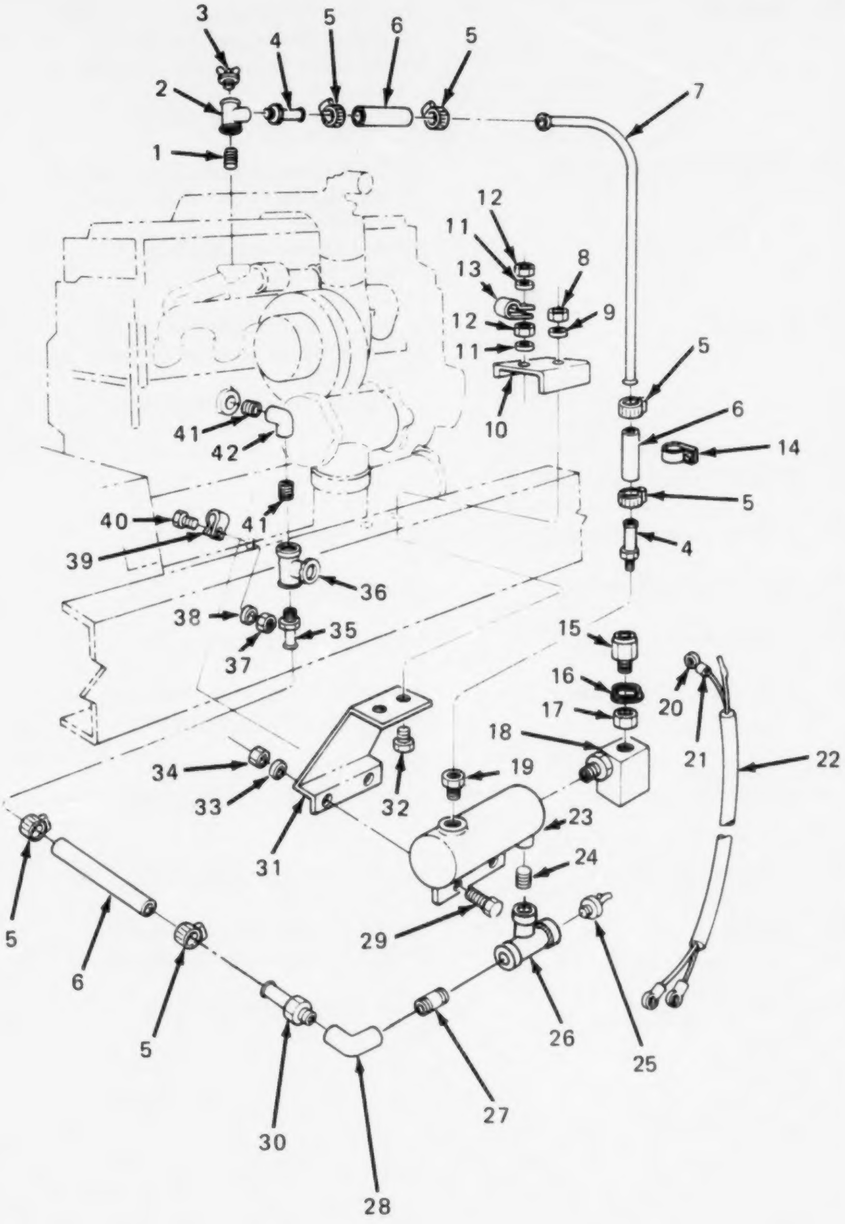
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
	NOTE The thermostat (18) cannot be replaced separate of the heater.	
13. Bracket (10).	Assemble to support (31) and secure with bolt (32), lockwasher (9) and nut (8).	
14. Heater (23) and thermostat (12).	Mount to support (31) with two screws (29), nuts (34) and lockwashers (33).	
15. Wire assembly (22).	Reroute, if removed.	
16. Three harness clamps (13), (14), and (39).	a. Install harness clamps (13) and (14) and secure with two nuts (12), bolts (32) and lockwashers (11). b. Install harness clamp (39) and secure with nut (37), bolt (40) and lockwasher (38).	
17. Wire assembly (22), cable grip (15), washer (16) and locknut (17).	Install on thermostat (18).	
18. Elbow (28), two nipples (24) and (27), tee (26), and draincock (25).	a. Coat threads with liquid teflon. b. Install on forward port on bottom of heater (23).	
19. Two nipples (41), valve (36), elbow (42), and adapter (35).	a. Coat threads with liquid teflon. b. Install on engine block.	
20. Hose (6).	a. Install two hose clamps (5). b. Fit ends on adapters (30) and (35). c. Tighten hose clamps (5).	
21. Bushing (19).	a. Coat threads with liquid teflon. b. Install in rear port of heater (23).	

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NIPPLE
2. TEE
3. DRAIN COCK
4. ADAPTER
5. HOSE CLAMP (6)
6. HOSE (3)
7. PIPE
8. NUT
9. LOCKWASHER
10. BRACKET
11. LOCKWASHER
12. NUT (2)
13. HARNESS CLAMP
14. HARNESS CLAMP
15. CABLE GRIP
16. WASHER
17. LOCKNUT
18. THERMOSTAT
19. BUSHING
20. TERMINAL
21. SPLICE CONNECTOR
22. WIRE ASSEMBLY
23. HEATER
24. NIPPLE
25. DRAINCOCK
26. TEE
27. NIPPLE
28. ELBOW
29. SCREW (2)
30. ADAPTER
31. SUPPORT
32. BOLT (2)
33. LOCKWASHER (2)
34. NUT (2)
35. ADAPTER
36. VALVE
37. NUT
38. LOCKWASHER
39. CLAMP
40. SCREW
41. NIPPLE (2)
42. ELBOW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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

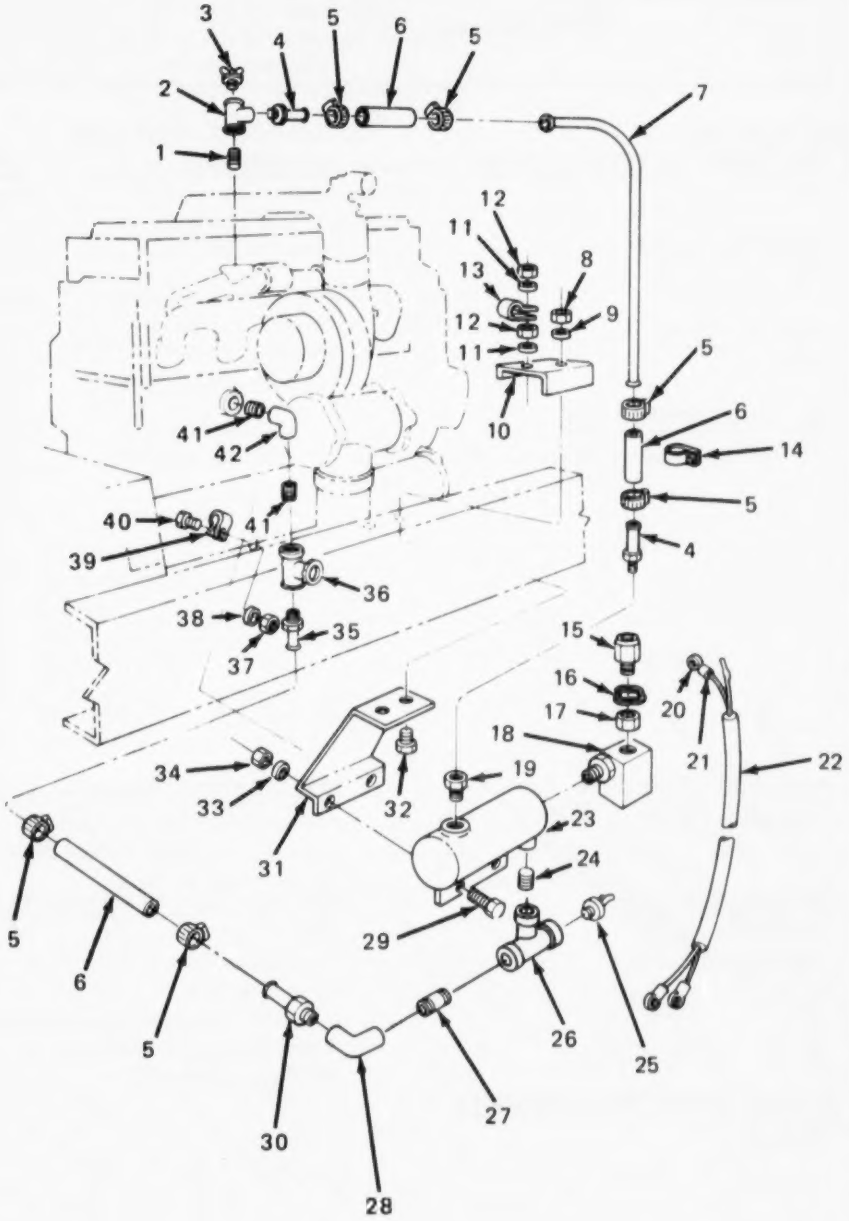
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
22. Hose (6).	a. Insert thru harness clamp (14). b. Install two hose clamps (5). c. Fit ends on adapter (4) and pipe (7). d. Tighten hose clamps (5).	
23. Nipple (1) and tee (2).	a. Coat threads with liquid teflon. b. Install nipple (1) into water manifold. c. Install draincock (3) and adapter (4).	
24. Hose (6).	a. Install two hose clamps (5). b. Fit ends on adapter (4) and pipe (7). c. Tighten hose clamps (5).	
C. OPERATIONAL CHECK.		
25. Engine coolant system.	Refill, refer to para 4-42C.	
26. Engine air cleaner.	Install, refer to para 4-25D.	
27. Engine turbo air inlet.	Install, refer to para 4-27C.	
28. 110 VAC power cord.	Plug into curcuit breaker box receptacle and power source.	
29. Engine coolant heater circuit breaker.	Flip to ON and verify that heater (23) functions properly.	After check, flip circuit breaker to OFF and disconnect power cord.
30. Vehicle batteries.	Reconnect, per para 5-37B.	
31. Engine.	Start up (refer to TM 9-2320-273-10) and check for leaks.	
32. Engine.	Shut down, refer to TM 9-2320-273-10.	

5-90. WINTERIZATION KIT ENGINE COOLANT HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. NIPPLE
2. TEE
3. DRAIN COCK
4. ADAPTER
5. HOSE CLAMP (6)
6. HOSE (3)
7. PIPE
8. NUT
9. LOCKWASHER
10. BRACKET
11. LOCKWASHER
12. NUT (2)
13. HARNESS CLAMP
14. HARNESS CLAMP
15. CABLE GRIP
16. WASHER
17. LOCKNUT
18. THERMOSTAT
19. BUSHING
20. TERMINAL
21. SPLICE CONNECTOR
22. WIRE ASSEMBLY
23. HEATER
24. NIPPLE
25. DRAINCOCK
26. TEE
27. NIPPLE
28. ELBOW
29. SCREW (2)
30. ADAPTER
31. SUPPORT
32. BOLT (2)
33. LOCKWASHER (2)
34. NUT (2)
35. ADAPTER
36. VALVE
37. NUT
38. LOCKWASHER
39. CLAMP
40. SCREW
41. NIPPLE (2)
42. ELBOW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TA 074852

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(60)
b. Installation.	(60)
c. Operational Check.	(15)
	135 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-38A.	Batteries Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level ground.
Battery Thermostat Must be Below 35°F for Actuation of Heater.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmision in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to OFF.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

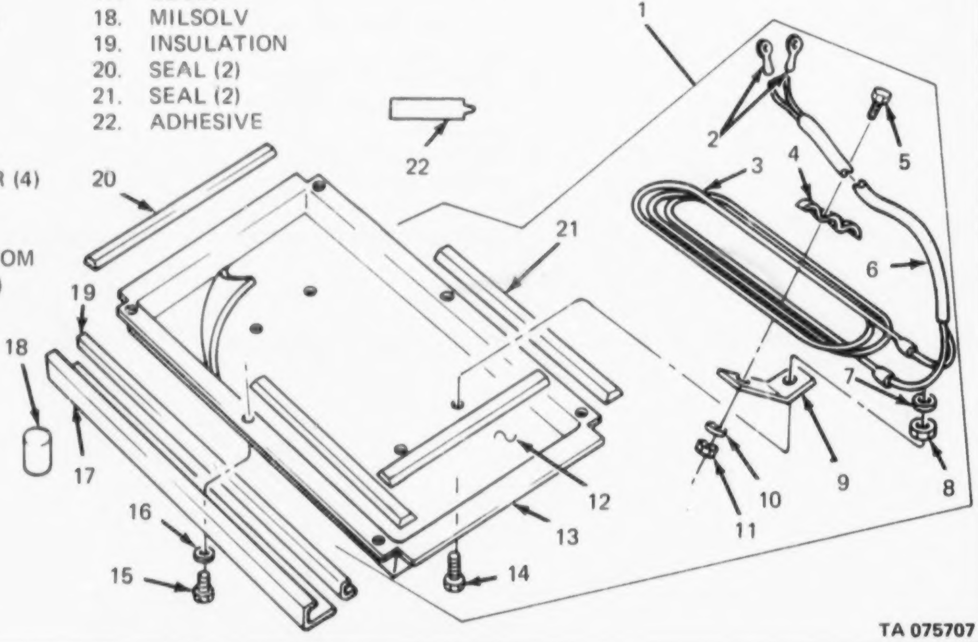
5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Cover assembly (1).	a. Mark and disconnect terminals (2) from terminal strip. b. Remove six screws (15) and lockwashers (16). c. Remove cover assembly from bottom of battery box.	Refer to para 5-92.
2. Heater (3) and loom (6).	a. Remove four capscrews (14), washers (8), and nuts (7). b. Remove heater (3) and loom (6) from bottom cover (13).	
3. Four brackets (9) and tube clips (4).	a. Remove four screws (5), lockwashers (10) and nuts (11). b. Remove four brackets (9) and tube clips (4).	
4. Cover (17), insulation (19), and seals (20) and (21).	a. Remove. b. Clean surface with Milsolv (18).	 Milsolv (18) supplied with kit.

LEGEND:

1. COVER ASSEMBLY
2. TERMINAL
3. HEATER
4. TUBE CLIP (4)
5. SCREW (4)
6. LOOM
7. NUT (4)
8. WASHER (4)
9. BRACKET (4)
10. LOCKWASHER (4)
11. NUT (4)
12. INSULATION
13. COVER, BOTTOM
14. CAPSCREW (4)
15. SCREW (6)
16. LOCKWASHER (6)
17. COVER
18. MILSOLV
19. INSULATION
20. SEAL (2)
21. SEAL (2)
22. ADHESIVE



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SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Insulation (12) and bottom cover (13).	a. Remove. b. Clean surface with Milsolv (18).	
B. INSTALLATION.		
6. Insulation (12) and bottom cover (13).	a. Apply adhesive (22) to bottom cover (13).	Adhesive (22) supplied with kit.
7. Insulation (19) and cover (17).	a. Install insulation (19) in place. b. Install cover (17).	
8. Four seals (20) and (21).	a. Apply adhesive (22) to seals. b. Stick in place.	
9. Heater (3) and loom (6).	a. Install four brackets (9) and tube clips (4). b. Secure with four screws (5), lockwashers (10), and nuts (11). c. Position heater (3) and loom (6) on bottom cover (13) and aline four mounting holes. d. Install four capscrews (14), washers (8) and nuts (7) and tighten. e. Tighten four nuts (11), lockwashers (10) and screws (5).	Do not tighten nuts (11) at this time.
10. Cover assembly (1).	Install to bottom of battery box.	Position loom (6) so it is accessible after installation of cover assembly (1).
11. Two terminals (2).	Connect to terminal strip.	Refer to para 5-92.

5-91. WINTERIZATION KIT BATTERY BOX HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK.		
12. 110 VAC power cord.	Plug into power source and vehicle receptacle. Flip battery heater circuit ON.	
13. Heater (3).	Verify that heater (3) functions properly.	Thermostat closes at 35°F (1.7°C) and opens at 55°F (12.8°C).

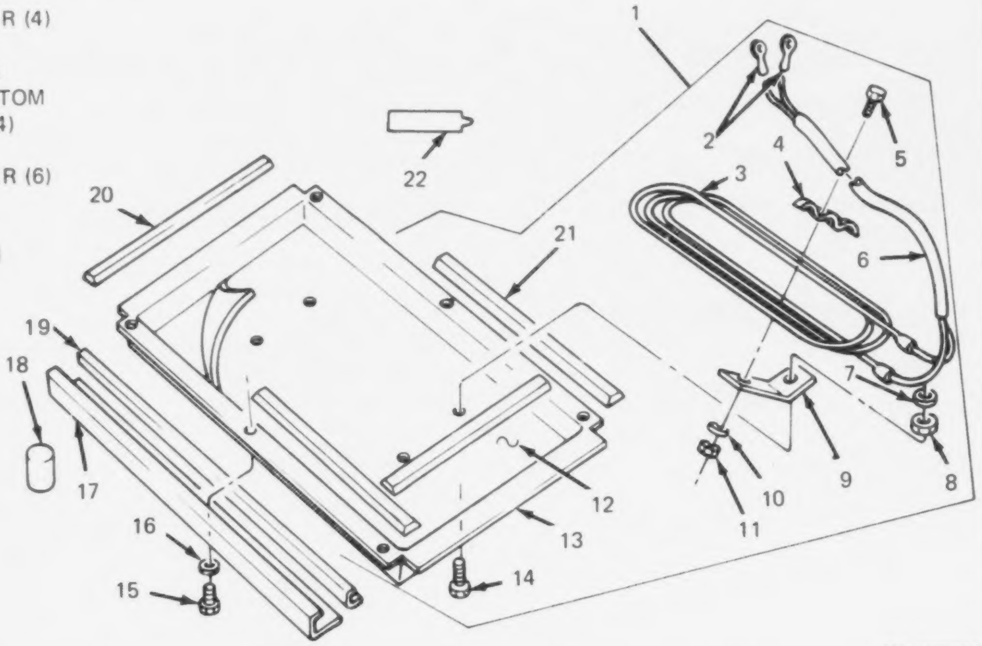
NOTE

Follow-on maintenance action required:

Install and connect batteries per para 5-38E.

LEGEND:

1. COVER ASSEMBLY
2. TERMINAL
3. HEATER
4. TUBE CLIP (4)
5. SCREW (4)
6. LOOM
7. NUT (4)
8. WASHER (4)
9. BRACKET (4)
10. LOCKWASHER (4)
11. NUT (4)
12. INSULATION
13. COVER, BOTTOM
14. CAPSCREW (4)
15. SCREW (6)
16. LOCKWASHER (6)
17. COVER
18. MILSOLV
19. INSULATION
20. SEAL (2)
21. SEAL (2)
22. ADHESIVE



TA 075708

SENDING UNITS, SWITCHING DEVICES, AND WINTERZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(45)
b. Installation.	(45)
c. Operational Check.	(15)
	105 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-38A.	Batteries Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 5-14.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
Battery Thermostat Must be Below 35°F for Actuation of Heater.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to OFF.

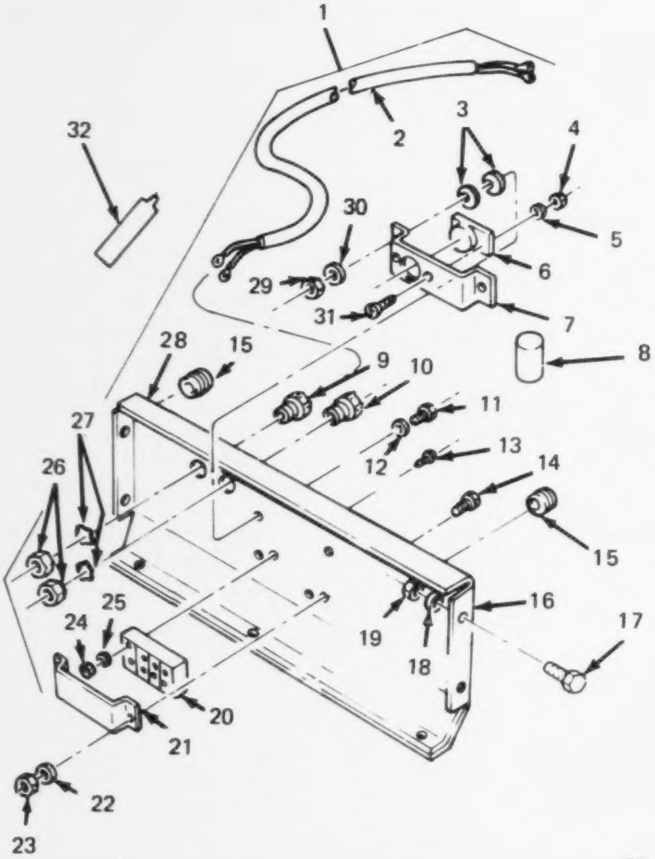
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Rear cover assembly (1).	a. Remove seven capscrews (17), seven lockwashers (18) and four hex nuts (19). b. Remove rear cover (16).	Hex nuts (19) are only used on sides of rear cover (16).
2. Cover (7).	Remove two screws (11), four teflon washers (3), two bushings (30) and hex nuts (29).	
3. Thermostat assembly (6).	a. Remove two screws (31), lockwashers (5), and hex nuts (4). b. Remove thermostat assembly (6) from cover (7).	

LEGEND:

1. REAR COVER ASSEMBLY
2. WIRE ASSEMBLY
3. TEFLON WASHER (4)
4. HEX NUT (2)
5. LOCKWASHER (2)
6. THERMOSTAT ASSEMBLY
7. COVER
8. MILSOLV
9. CABLE GRIP
10. CABLE GRIP
11. SCREW (2)
12. LOCKWASHER (2)
13. SCREW (2)
14. SCREW (2)
15. GROMMET (2)
16. REAR COVER
17. CAPSCREW (7)
18. LOCKWASHER (7)
19. HEX NUT (4)
20. TERMINAL STRIP
21. COVER
22. LOCKWASHER
23. HEX NUT (2)
24. HEX NUT (2)
25. LOCKWASHER (2)
26. CONDUIT NUT (2)
27. REDUCING WASHER (2)
28. INSULATION
29. HEX NUT (2)
30. BUSHING (2)
31. SCREW (2)
32. ADHESIVE



TA 075709

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANANCE (Continued).

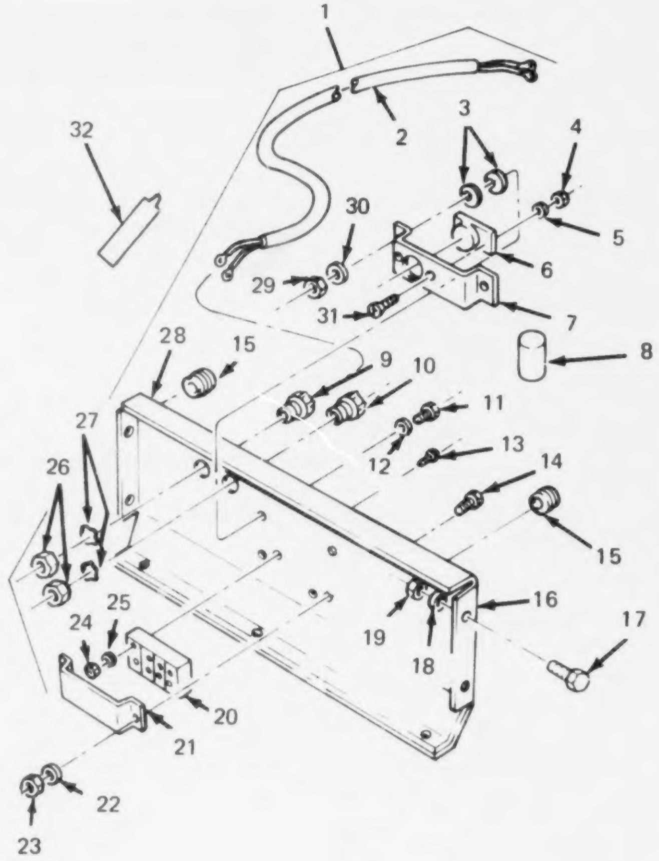
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Cover (21).	Remove two hex nuts (23), lockwashers (22), and screws (14).	
5. Terminal strip (20).	a. Remove wire assembly (2). b. Remove two hex nuts (24), lockwashers (25) and screws (13).	Tag terminals to aid in reassembly.
6. Two cable grips (9) and (10).	Remove two conduit nuts (26). and reducing washers (27).	
7. Two grommets (15).	Remove.	
8. Insulation (28).	Remove with sharp tool or putty knife and clean off adhesive with Milsolv (8).	Milsolv (8) supplied with kit.
B. INSTALLATION.		
9. Insulation (28).	a. Install adhesive (32) to rear cover (16). b. Put insulation (28) in place.	Adhesive (32) supplied with kit.
10. Two grommets (15).	Install.	
11. Two cable grips (9) and (10).	Install into rear cover and secure with two reducing washers (27) and conduit nuts (26).	
12. Terminal strip (20).	a. Install and secure with two screws (13), lockwashers (25) and screws (13). b. Install wire assembly (2).	
13. Cover (21).	Install and secure with two hex nuts (23), lockwashers (22), and screws (14).	

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. REAR COVER ASSEMBLY
2. WIRE ASSEMBLY
3. TEFLON WASHER (4)
4. HEX NUT (2)
5. LOCKWASHER (2)
6. THERMOSTAT ASSEMBLY
7. COVER
8. MILSOLV
9. CABLE GRIP
10. CABLE GRIP
11. SCREW (2)
12. LOCKWASHER (2)
13. SCREW (2)
14. SCREW (2)
15. GROMMET (2)
16. REAR COVER
17. CAPSCREW (7)
18. LOCKWASHER (7)
19. HEX NUT (4)
20. TERMINAL STRIP
21. COVER
22. LOCKWASHER
23. HEX NUT (2)
24. HEX NUT (2)
25. LOCKWASHER (2)
26. CONDUIT NUT (2)
27. REDUCING WASHER (2)
28. INSULATION
29. HEX NUT (2)
30. BUSHING (2)
31. SCREW (2)
32. ADHESIVE



TA 075710

5-92. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
14. Thermostat assembly (6).	Install in cover (7) and secure with two screws (31), lockwashers (5), and hex nuts (4).	
15. Cover (7).	Install and secure with two screws (11), four teflon washers (3), two bushings (30), and hex nuts (29).	
16. Rear cover assembly (1).	Install and secure with seven capscrews, seven lockwashers (18), and four hex nuts (19).	Hex nuts (19) are only used on sides of rear cover (16).
C. OPERATIONAL CHECK.		
17. 110 VAC power cord.	Plug into power source and vehicle receptacle. Flip battery heater circuit ON.	
18. Thermostat assembly (6).	Verify operation.	Thermostat closes at 35°F (1.7°C) and opens at 55°F (12.8°C).

NOTE

Follow-on maintenance action required:

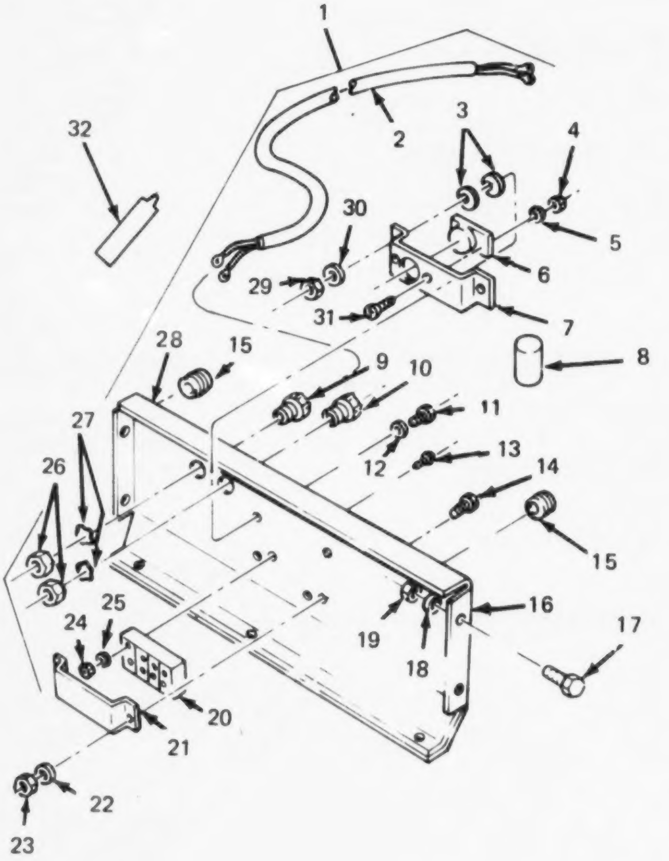
Install and connect batteries per para 5-38E.

5-93. WINTERIZATION KIT BATTERY BOX THERMOSTAT AND TERMINAL STRIP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. REAR COVER ASSEMBLY
2. WIRE ASSEMBLY
3. TEFLON WASHER (4)
4. HEX NUT (2)
5. LOCKWASHER (2)
6. THERMOSTAT ASSEMBLY
7. COVER
8. MILSOLV
9. CABLE GRIP
10. CABLE GRIP
11. SCREW (2)
12. LOCKWASHER (2)
13. SCREW (2)
14. SCREW (2)
15. GROMMET (2)
16. REAR COVER
17. CAPSCREW (7)
18. LOCKWASHER (7)
19. HEX NUT (4)
20. TERMINAL STRIP
21. COVER
22. LOCKWASHER
23. HEX NUT (2)
24. HEX NUT (2)
25. LOCKWASHER (2)
26. CONDUIT NUT (2)
27. REDUCING WASHER (2)
28. INSULATION
29. HEX NUT (2)
30. BUSHING (2)
31. SCREW (2)
32. ADHESIVE



TA 075711

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Cleaning.	(45)
c. Installation.	(15)
	90 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-38A.	Batteries Removed.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
Battery Thermostat Must be Below 35°F for Actuation of Heater.

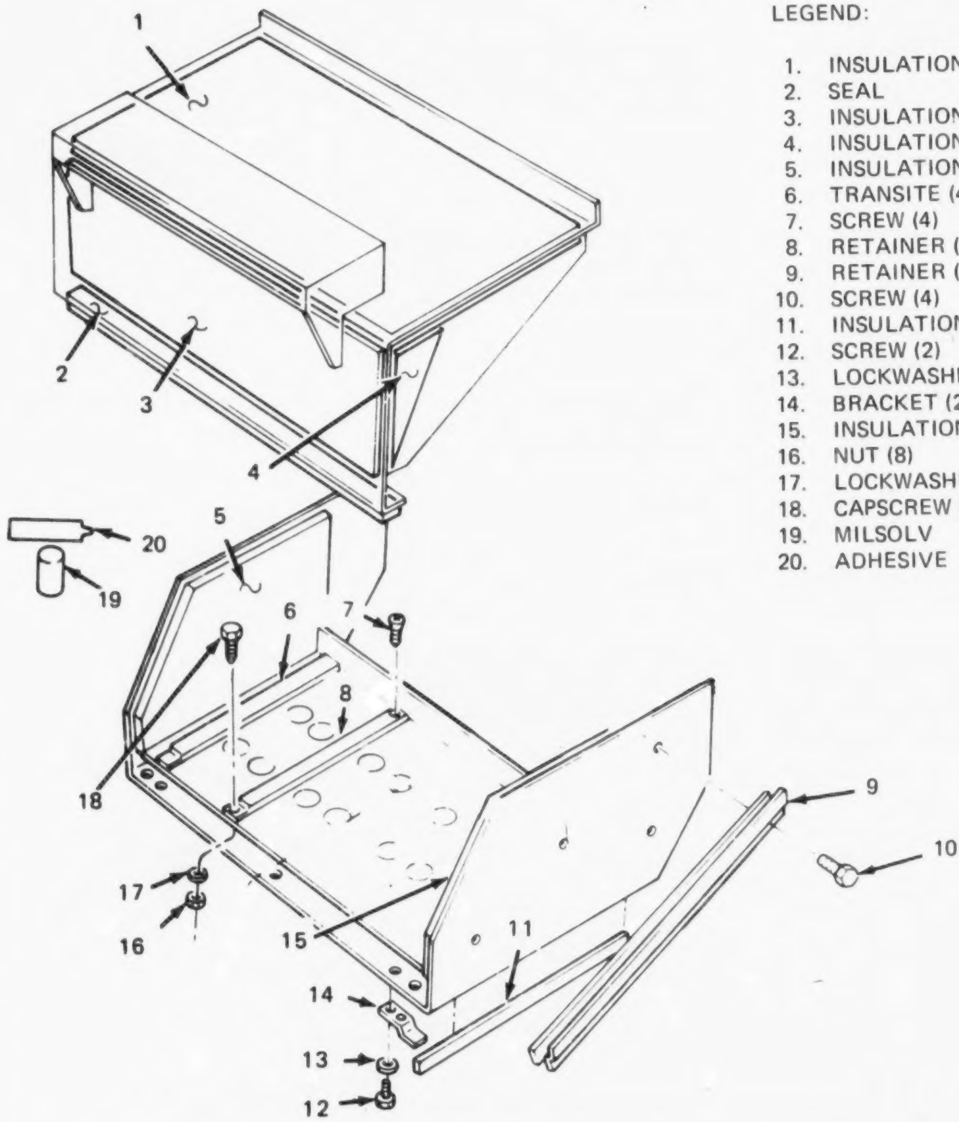
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
110 VAC Cable Disconnected From Power Source and Receptacle.
All Breakers Set to OFF.

SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Insulation (1), (3), (4), (5), and (15), and seal (2).	If insulation is damaged or needs replacement scrape off with sharp tool or putty knife and clean off adhesive with Milsolv (19).	Milsolv (19) supplied with kit.



LEGEND:

1. INSULATION
2. SEAL
3. INSULATION
4. INSULATION (2)
5. INSULATION
6. TRANSITE (4)
7. SCREW (4)
8. RETAINER (4)
9. RETAINER (2)
10. SCREW (4)
11. INSULATION (2)
12. SCREW (2)
13. LOCKWASHER (2)
14. BRACKET (2)
15. INSULATION
16. NUT (8)
17. LOCKWASHER (8)
18. CAPSCREW (4)
19. MILSOLV
20. ADHESIVE

TA 075712

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Four capscrews (18), lockwashers (17), nuts (16), and screws (7).	Remove and lift out four retainers (8), and transite (6).	
3. Four screws (10), and two retainers (9),	Remove.	
4. Two screws (12), lockwashers (13), and brackets (14).	Remove and scrape off insulation (11) with sharp tool or putty knife.	
B. CLEANING.		
5. Battery compartment.	Wash out with high pressure water or steam and clean off adhesive with Milsolv (19).	
C. INSTALLATION.		
6. Adhesive (20), insulation (1), (3), (4), (5), (11), and (15), and seal (2).	Apply adhesive (20) to all insulation panels and apply to their respective places.	Adhesive (20) supplied with kit.
7. Two brackets (14), lockwashers (13), and screws (12).	Install.	
8. Four screws (10), and two retainers (9).	Install.	
9. Four capscrews (18), eight lockwashers (17), and nuts (16), four retainers (8), four transites (6), and screws (7).	Install four retainers (8) and transite (6) and secure with four capscrews (8) and screws (7).	

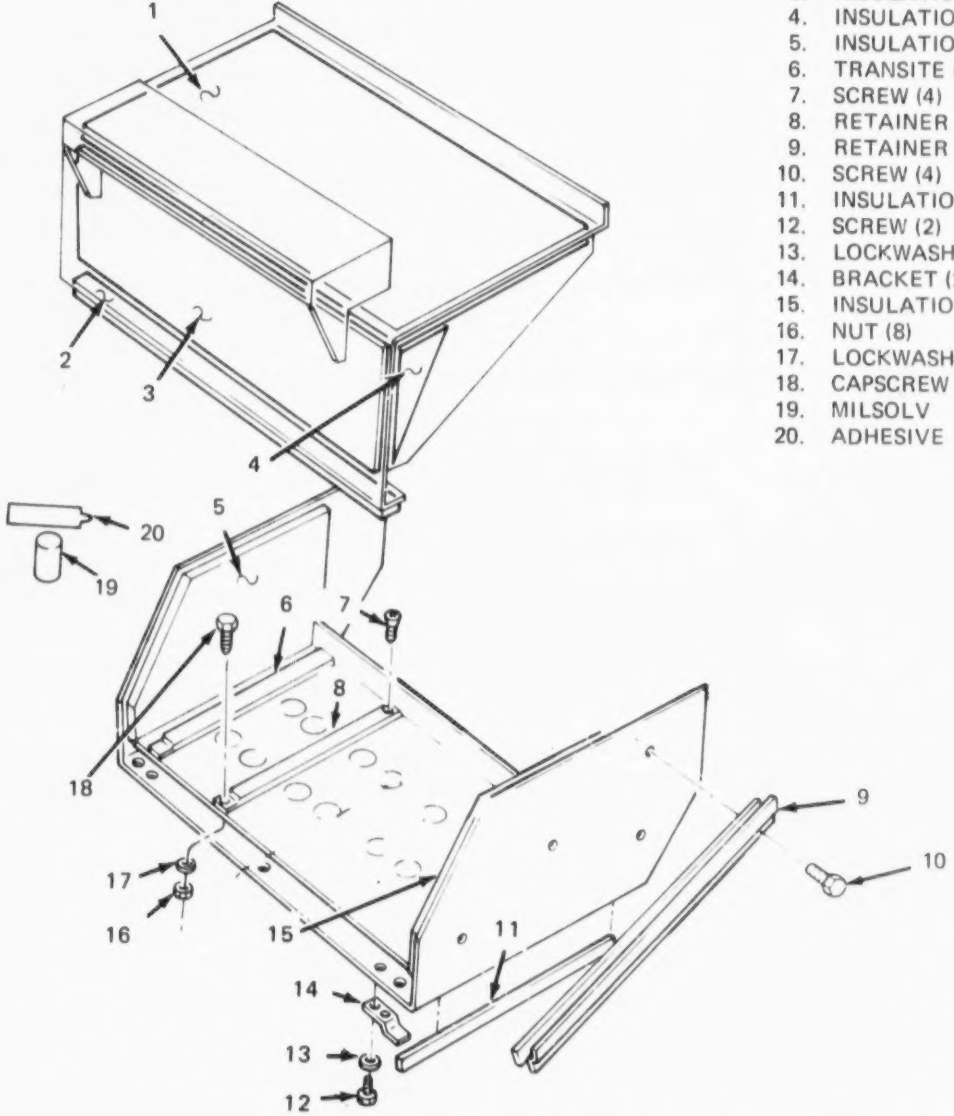
SENDING UNITS, SWITCHING DEVICES, AND WINTERIZATION KIT.

5-93. WINTERIZATION KIT BATTERY BOX INSULATION MAINTENANCE (Continued).

LOCATION/ITEM ACTION REMARKS

LEGEND:

1. INSULATION
2. SEAL
3. INSULATION
4. INSULATION (2)
5. INSULATION
6. TRANSITE (4)
7. SCREW (4)
8. RETAINER (4)
9. RETAINER (2)
10. SCREW (4)
11. INSULATION (2)
12. SCREW (2)
13. LOCKWASHER (2)
14. BRACKET (2)
15. INSULATION
16. NUT (8)
17. LOCKWASHER (8)
18. CAPSCREW (4)
19. MILSOLV
20. ADHESIVE



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CHAPTER 6

TRANSMISSION MAINTENANCE

6-1. OVERVIEW .

This chapter provides you with the following information related to transmission maintenance:

a. All required special tools and equipment.
b. Other technical manuals.
c. Troubleshooting procedures.
d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

6-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

6-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the transmission maintenance procedures described in this chapter are as follows: 0-150 psi (0-1034 kPa) air pressure gage (refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration).

6-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the repair parts and special tools list covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

6-5. INTRODUCTION.

Troubleshooting procedures (table 6-1) are limited to those on-vehicle checks for which corrective actions are within the scope of Organizational Maintenance. Prior to starting any troubleshooting, the malfunction should be verified after the transmission has been warmed up to over 100°F (37.8°C) since a cold transmission can give faulty indications. To warm the transmission, run the engine for approximately 10 minutes with the transmission in NEUTRAL. The transmission will feel warm to the touch.

6-6. TEST EQUIPMENT.

An air pressure gage with a range of 0-150 psi (0-1034 kPa) is required to check for proper air pressure.

Table 6-1. Transmission Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. SELECTOR LEVER CANNOT BE MOVED:

Step 1. Inhibitor plate jammed with dirt.

Remove cover, clean, and lubricate (See LO 9-2320-273-12).

Step 2. Inhibitor centering piston assembly out of alinement or damaged.

Replace (Refer to Direct Support).

Step 3. Bolts holding air control line to ratio selector too long or incorrectly torqued.

Tighten to 9 lb-ft (12 N·m), replace damaged components, or use shorter bolts.

Step 4. Bolts incorrectly installed when ratio selector assembled.

Check to see that bolts are not run in at an angle.

2. ENGINE DOES NOT TURN DRIVESHAFT IN ANY SPEED FORWARD OR REVERSE:

Step 1. Check oil level in transmission.

Add oil to correct level (see LO 9-2320-273-12).

Step 2. Check to see that air hand control valve on ratio selector is pushed in.

Push in hand valve.

Step 3. Check to see that air pressure supply is available and adequate to transmission; 60-120 psi (414-827 kPa).

Troubleshoot compressed air system (para 9-5).

Step 4. Inspect air control line and connectors between ratio selector and transmission.

Tighten to 18 lb-ft (24 N·m) or replace damaged components.

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

2. ENGINE DOES NOT TURN DRIVESHAFT IN ANY SPEED FORWARD OR REVERSE (Continued):

Step 5. Check to see that air pressure is available at ratio selector from truck compressed air system.

a. Troubleshoot compressed air system (para 9-5).

b. Refer to Direct Support Maintenance for troubleshooting.

3. ENGINE TURNS DRIVE SHAFT IN SOME GEARS BUT NOT OTHERS:

Step 1. Check to see that adequate compressed air is available from truck.

Troubleshoot compressed air system (para 9-5).

Step 2. Check air control line and connections between ratio selector and transmission for tight connections, damage and leaks.

a. Tighten to 18 lb-ft (24 N·m) or replace damaged components.

b. Refer to Direct Support Maintenance for troubleshooting.

4. ENGINE DOES NOT TURN POWER TAKEOFF IN NEUTRAL:

Perform same steps as in Malfunction 2.

5. TRUCK MOVES WHEN ENGINE IS AT LOW IDLE AND TRANSMISSION IN GEAR:

Step 1. Check engine low idle rpm (should be 580-620 rpm).

Refer to Direct Support Maintenance for adjustment.

Step 2. Check transmission operating temperature.

Allow transmission temperature to reach 100°F (37.8°C) before putting truck in gear.

Step 3. Put selector lever in NEUTRAL and check engine rpm at low idle. Put selector lever in 4th gear and check engine rpm.

a. If engine rpm does not change, the problem is corrected.

b. If engine rpm decreases, the input clutch may be warped. Refer to Direct Support Maintenance for repairs.

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

6. TRANSMISSION HOUSING BREATHERS SHOW AN AIR LEAK AFTER THE SHIFT IS COMPLETE:

Refer to Direct Support Maintenance for troubleshooting.

7. TRANSMISSION FEELS LIKE IT IS ENGAGED, THEN NOT ENGAGED, THEN ENGAGED AGAIN – TRANSMISSION IS ALSO NOISY:

Refer to Direct Support Maintenance for troubleshooting.

8. TRANSMISSION HAS A DECREASE IN OIL LEVEL WITH AN INCREASE IN OIL IN THE ENGINE:

Step 1. Check for inoperative breathers.

Replace the breathers (para 6-9C and 6-9D).

Step 2. Check engine crankshaft seal.

Refer to Direct Support Maintenance.

9. TRANSMISSION GEARS MAKE NOISE DURING A SHIFT:

Step 1. Check for correct oil level.

Add oil to correct level (refer to LO 9-2320-273-12).

Step 2. Check for oil leaks.

Refer problem to Direct Support Maintenance.

Step 3. Check for clogged oil pump suction screen.

Clean screen (para 6-9B).

Table 6-1. Transmission Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

10. TRANSMISSION TEMPERATURE GAGE READINGS ABNORMALLY HIGH:

Step 1. Check for correct oil level.

Add or remove oil to correct level (refer to LO 9-2320-273-12).

Step 2. Check for oil leaks.

Refer problem to Direct Support Maintenance.

Step 3. Check for clogged oil pump suction screen.

Clean screen (para 6-9B).

Step 4. Check oil cooler fins for obstructions.

Clean cooling fins.

Section III/ MAINTENANCE PROCEDURES

6-7. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the transmission. The scope of maintenance is limited to the work listed in the following summary of task procedures.

6-8. TRANSMISSION MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Dry Cleaning Solvent SD-2 (Refer to Appendix C).
Oil — 5.5 Gallons (Refer to Appendix C).
Case Breathers (12), (2520-01-077-2803).
Oil Funnel.
Container, 6 Gal Min.
Gaskets (2), 9N4010 (11083).
O-Ring, 3D2824 (11083).
Soap Solution.
Gaskets (2), 9N1507 (11083).
Loctite (242).
Masking Tape.
Marking Pen.
Cable Ties (8) SST4S (06383).
Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS (63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 6-1, 5-7, 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
11-16A.	Front Radiator Shell and Screen Removed.
11-16E.	Brush Guard Removed (916 thru 920).
4-23A.	Fuel Tank Removed.
4-30A.	Ether Cylinder Removed.
5-37A.	Batteries Disconnected.
6-11A.	Floor Access Plate Removed.
9-16A.	Supply Air Reservoir Removal (M916 thru M920 Only).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission in Neutral.

6-8. TRANSMISSION MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Oil Service:	6-9	6-1
	A. Draining Oil.	6-9A	
	B. Cleaning or Replacement of Pump Screen.	6-9B	
	C. Removal of Case Breather.	6-9C	
	D. Installation of New Case Breather.	6-9D	
	E. Replenishing Oil Supply.	6-9E	
	F. Checking for Leaks.	6-9F	
2.	Oil Cooler Maintenance:	6-10	6-1
	A. Removal.	6-10A	
	B. Cleaning and Inspection.	6-10B	
	C. Installation.	6-10C	
3.	Pneumatic Control Line Maintenance:	6-11	9-1
	A. Removal.	6-11A	
	B. Inspection.	6-11B	
	C. Installation.	6-11C	
	D. Checking for Leaks.	6-11D	
4.	Ratio Selector and Air Charging Valve Maintenance:	6-12	9-1
	A. Removal.	6-12A	
	B. Inspection of Lines and Fittings.	6-12B	
	C. Lubrication of Ratio Selector.	6-12C	
	D. Installation.	6-12D	
	E. Operational Check.	6-12E	
5.	Speedometer Cable Maintenance:	6-13	5-7
	A. Removal.	6-13A	
	B. Installation.	6-13B	
	C. Operational Check.	6-13C	
6.	Transmission Control Heater Maintenance:	6-14	
	A. Removal.	6-14A	
	B. Installation.	6-14B	
	C. Operational Check.	6-14C	

6-9. OIL SERVICE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Draining Oil.	(10)
b. Cleaning or Replacement of Pump Screen.	(15)
c. Removal of Case Breather.	(5)
d. Installation of New Case Breather.	(5)
e. Replenishing Oil Supply.	(10)
f. Checking for Leaks.	(10)
	55 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
Oil, 5.5 gallons (21 Liters) (Refer to Appendix C);
OEA if Sub-Zero Use.
Case Breathers (12) (2520-01-077-2803).
Oil Funnel.
Container, 6 gal min.
Loctite (242).
Gaskets (2), 9N1507 (11083).
O-Ring, 3D2824 (11083).

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 6-1.

TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS

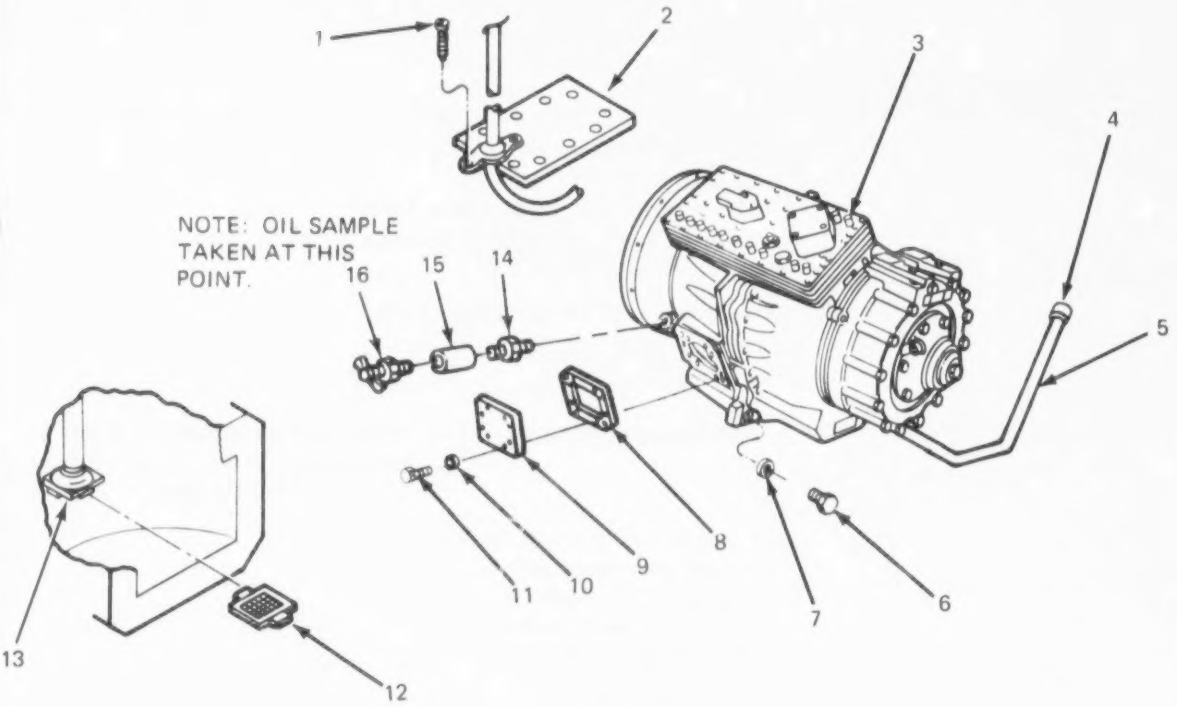
NOTE

Transmission should be warm for this task. Park the truck on level ground.

A. DRAINING OIL.

NOTE

Place container under drain plug to catch oil.



NOTE: OIL SAMPLE TAKEN AT THIS POINT.

LEGEND:

1. SCREW (11)
2. ACCESS PLATE
3. CASE BREATHER (12)
4. DIPSTICK
5. DIPSTICK TUBE
6. DRAIN PLUG
7. O-RING
8. GASKET
9. ACCESS COVER
10. WASHER (8)
11. CAPSCREW (8)
12. PUMP SCREEN
13. SUCTION TUBE
14. REDUCER PIPE
15. COUPLING PIPE
16. DRAIN COCK

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6-9. OIL SERVICE (Continued).

A. DRAINING OIL (Continued).

LOCATION/ITEM	ACTION	REMARKS
1. Dipstick (4).	Remove.	
2. Drain plug (6) and O-ring (7).	a. Unscrew and remove.	
	b. Throw away O-ring.	
	c. Allow oil to drain out.	
	d. Inspect magnetic base of plug.	If there are large metal particles notify Direct Support Maintenance.
	e. Install new O-ring (7) on drain plug (6).	
	f. Screw in plug and tighten.	

A.1. TAKING OIL SAMPLE FOR ANALYSIS

NOTE

Before beginning this task check transmission oil level according to operator's manual (TM 9-2320-273-10).

Start engine (see TM 9-2320-273-10), warm vehicle to normal operating range and stop engine.

LOCATION/ITEM	ACTION	REMARKS
1. Draincock (16)	a. Unscrew and loosen.	When taking a sample, first use a container to drain a small amount of oil to clean the valve assembly.
	b. When completed with task 1., use the proper bottle and take oil sample from the transmission drain valve (see TB 43-0210).	
	c. Check oil level to insure proper level after sampling.	

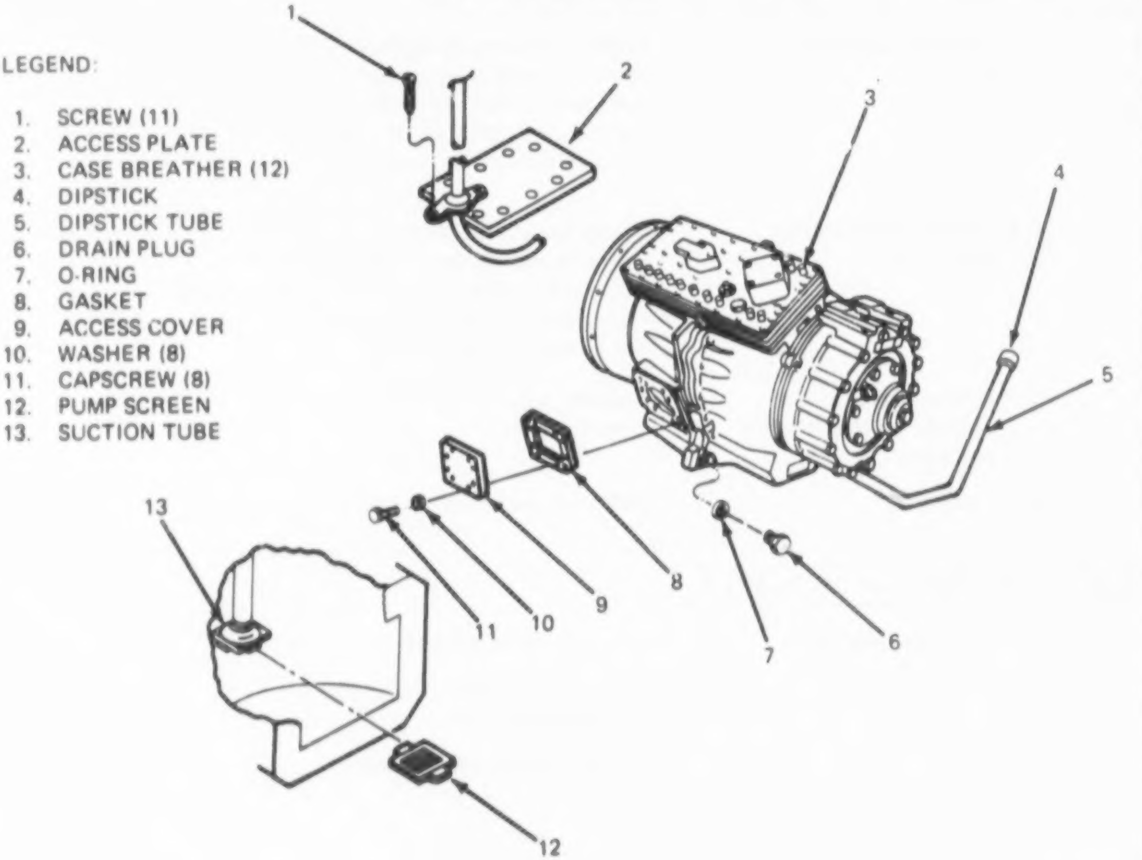
6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING OR REPLACEMENT OF PUMP SCREEN.		
3. Eight capscrews (11) and washers (10).	Unscrew and remove.	
4. Access cover (9) and gasket (8).	a. Remove. b. Discard gasket (8).	On the M916 thru M920 the left side access cover is blocked by the PTO, so you will have to use the right side cover.
	CAUTION Exercise care that when the pump screen is replaced, that it is properly latched. If not the screen will fall into the housing and may damage internal transmission parts.	
5. Pump screen (12).	a. Slide off of suction tube (13) by grasping metal spring tab and pushing down slightly while pulling out.	
	b. Inspect magnets.	If there are large metal particles, notify Direct Support Maintenance.
	c. Clean with dry cleaning solvent.	
	d. Dry with compressed air.	

TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING OR REPLACEMENT OF PUMP SCREEN (Continued).		
	e. Inspect.	If screen or magnets are damaged, replace assembly.
	f. Slide onto suction tube base, pushing down slightly on clip while sliding in.	Be sure spring clip latches screen in place. A distinct click will be heard. Check for proper engagement by pulling out with slight pressure and not pushing down on clip.
6. New gasket (8). access cover (9), eight capscrews (11), and washers (10).	a. Put in place. b. Tighten capscrews (11) to 31 lb-ft (42 N·m) with torque wrench.	



LEGEND:

1. SCREW (11)
2. ACCESS PLATE
3. CASE BREATHER (12)
4. DIPSTICK
5. DIPSTICK TUBE
6. DRAIN PLUG
7. O-RING
8. GASKET
9. ACCESS COVER
10. WASHER (8)
11. CAPSCREW (8)
12. PUMP SCREEN
13. SUCTION TUBE

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TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. REMOVAL OF CASE BREATHER.		
7. Floor mat.	Pull back at seam to expose access plate (2).	
8. Eleven screws (1).	Remove.	
9. Access plate (2).	Remove from cab floor.	
10. One case breather (3).	Unscrew, remove and throw away.	
10.1. If required, change vents (14).	Unscrew, remove and throw away.	
D. INSTALLATION OF NEW CASE BREATHER.		
11. One new case breather (3).	Apply loctite on threads, screw in and tighten carefully with pliers. Do not clamp too tightly, otherwise the plastic cap may crack.	
11.1. Eleven new breather vents (14).	Apply loctite on threads, screw in and tighten carefully with pliers. Do not clamp too tightly, otherwise the plastic cap may crack.	
12. Access plate (2) and control cable grommet and plate.	Position and secure with twelve screws (1).	
13. Floor mat.	Reinstall over cover plate.	
E. REPLENISHING OIL SUPPLY.		
14. Dipstick tube (5).	a. Insert tip of funnel. b. Pour in 5.5 gal (20.8 liters) transmission oil. c. Put dipstick (4) in place.	

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
F. CHECKING FOR LEAKS.		
15. Engine.	Start up (see TM 9-2320-273-10).	
16. Transmission.	Check for fluid and air leaks while engine is at low idle.	
17. Dipstick (4).	Check oil level. Add more if needed.	
18. Engine.	Shut down (see TM 9-2320-273-10).	

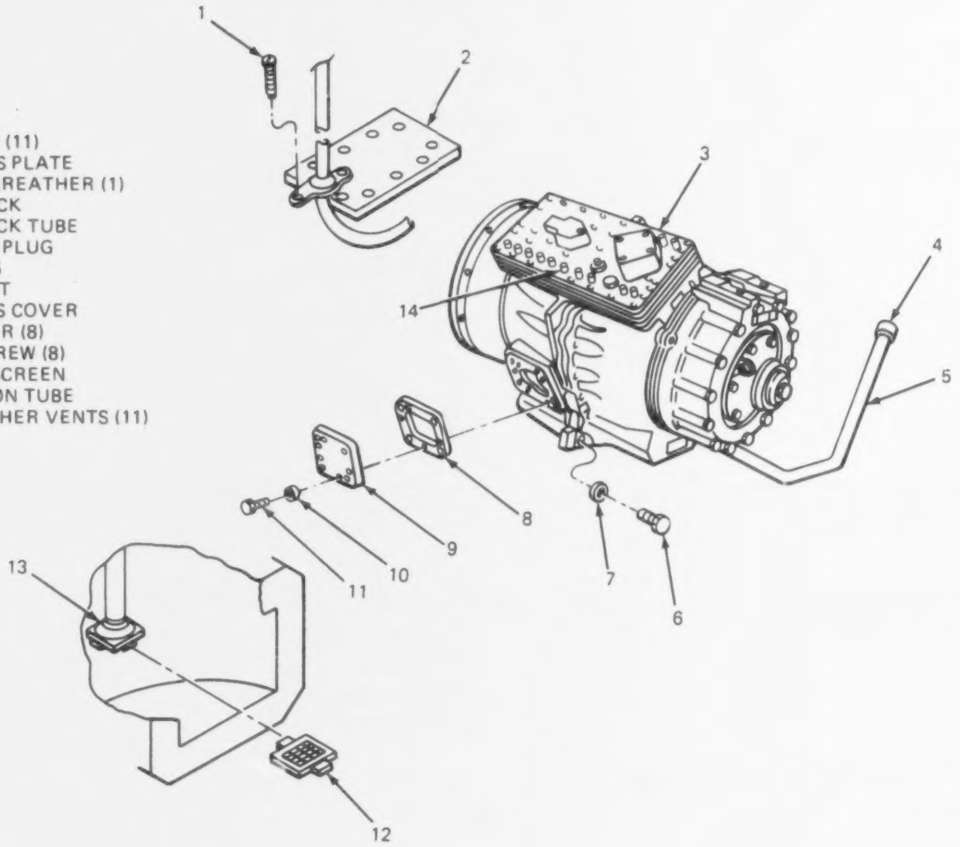
TRANSMISSION.

6-9. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS

CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.



LEGEND:

1. SCREW (11)
2. ACCESS PLATE
3. CASE BREATHER (1)
4. DIPSTICK
5. DIPSTICK TUBE
6. DRAIN PLUG
7. O-RING
8. GASKET
9. ACCESS COVER
10. WASHER (8)
11. CAPSCREW (8)
12. PUMP SCREEN
13. SUCTION TUBE
14. BREATHER VENTS (11)

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TRANSMISSION .

6-10. OIL COOLER MAINTENANCE .

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Cleaning and Inspection.	(15)
c. Installation.	(15)
	45 Minutes Total

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None .

MATERIALS/PARTS (P/N)

None .

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-16 A.	Front Radiator Shell and Screen Removed.
11-16 E.	Brush Guard Removed (M916 thru M920).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10 .

TROUBLESHOOTING REFERENCES

Table 6-1.

SPECIAL ENVIRONMENTAL CONDITIONS

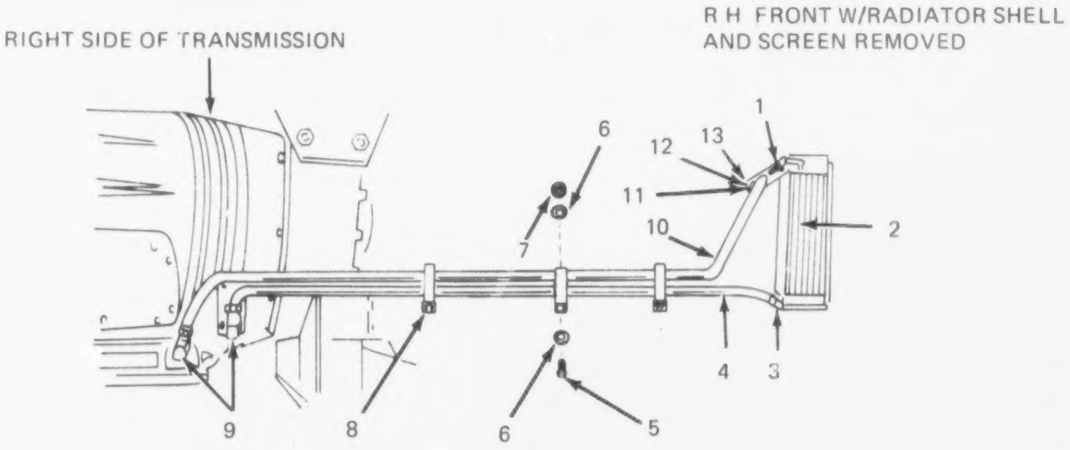
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

6-10. OIL COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Hydraulic hoses (4) and (10).	Remove from two transmission mounted elbows (9).	Remove by unscrewing barb fitting from elbow.
2. Three bolts (5), starwashers (6), and nuts (7).	Unscrew and remove three rubber coated hose retainers (8).	Retainers are located along top of frame rail.
3. Hydraulic hoses (4) and (10).	a. Remove from two oil cooler mounted elbows (1) and (3). b. Pull hydraulic hoses (4) and (10) out of vehicle.	Remove by unscrewing barb fitting from elbow.
4. Four bolts (11), lockwashers (12), and washers (13).	Unscrew and remove oil cooler (2).	


RIGHT SIDE OF TRANSMISSION
R H FRONT W/RADIATOR SHELL AND SCREEN REMOVED
1
6
12
13
11
10
2
7
4
3
9
8
6
5

LEGEND:

1. ELBOW
2. OIL COOLER
3. ELBOW
4. HYDRAULIC HOSE
5. BOLT (3)
6. STARWASHER (3)
7. NUT (3)
8. HOSE RETAINER (3)
9. ELBOW (2)
10. HYDRAULIC HOSE
11. BOLT (4)
12. LOCKWASHER (4)
13. WASHER (4)

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TRANSMISSION .

6-10. OIL COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND INSPECTION.		
5. Hydraulic hoses (4) and (10).	Inspect for cracking and leaks.	Replace as necessary.
6. Oil cooler (2).	Clean cooling fins, inspect for bent fins and leaks.	Replace as necessary.
C. INSTALLATION.		
7. Oil cooler (2).	Install with four bolts (11), lockwashers (12), and washers (13).	
8. Hydraulic hose (4) and (10).	a. Install to oil cooler mounted elbows (1) and (3). b. Install to transmission mounted elbows (9).	
9. Three hose retainers (8).	Install with three bolts (5), star washers (6), and nuts (7) and tighten.	Install hoses per illustration.

6-10. OIL COOLER MAINTENANCE (Continued).

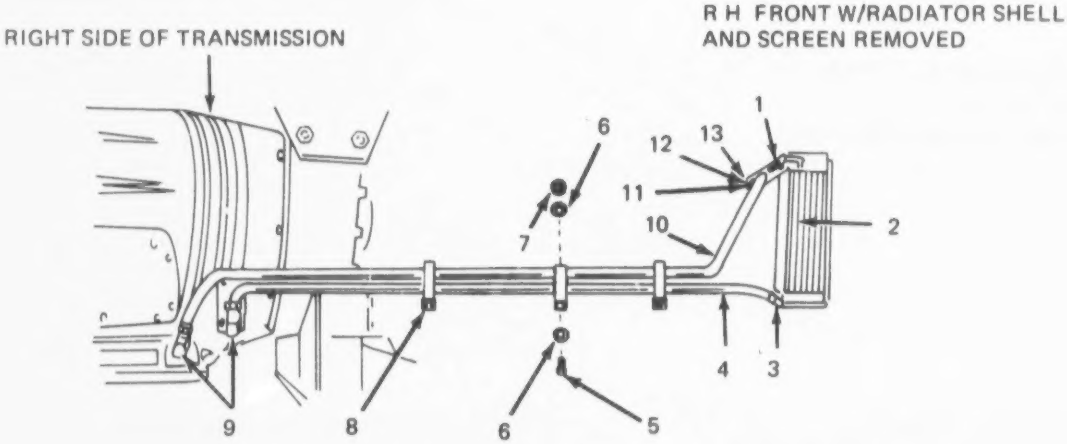
LOCATION/ITEM	ACTION	REMARKS

NOTE

Follow-on maintenance required:

a. Install front radiator shell and screen; refer to paragraph 11-16D.

b. Install Brush Guard; refer to paragraph 11-16F (M916 thru M920).


RIGHT SIDE OF TRANSMISSION
R H FRONT W/RADIATOR SHELL AND SCREEN REMOVED
1
2
3
4
5
6
6
7
8
9
10
11
12
13

LEGEND:

1. ELBOW
2. OIL COOLER
3. ELBOW
4. HYDRAULIC HOSE
5. BOLT (3)
6. STARWASHER (3)
7. NUT (3)
8. HOSE RETAINER (3)
9. ELBOW (2)
10. HYDRAULIC HOSE
11. BOLT (4)
12. LOCKWASHER (4)
13. WASHER (4)

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6-11. PNEUMATIC CONTROL LINE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Checking for Leaks.	(25)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.
Gaskets (Two), 9N4010 (11083).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20)

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

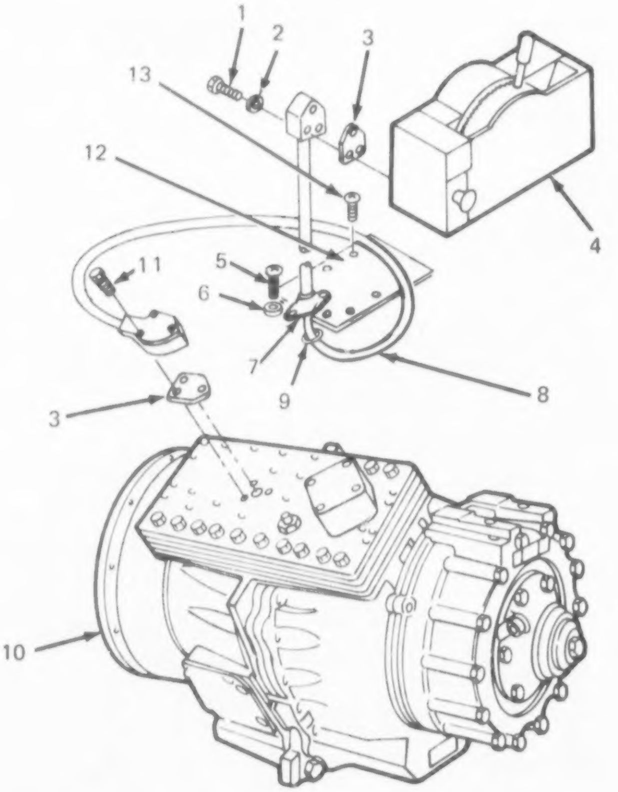
Do not begin work on air lines until pressure in air system has dropped completely.

NOTE

Pull back floor mat to expose access plate.

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET (2)
4. RATIO SELECTOR
5. SCREW (2)
6. WASHER (2)
7. RETAINER
8. CONTROL LINE
9. GROMMET
10. TRANSMISSION
11. BOLT (3)
12. ACCESS PLATE
13. SCREW (10)



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6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two screws (5) and washers (6).	Loosen and remove.	
2. Retainer (7).	Remove.	
3. Ten screws (13).	Loosen and remove.	
4. Access plate (12).	Remove.	
5. Grommet (9).	Remove.	
6. Three bolts (11).	Loosen and remove.	
7. Three bolts (1) and washers (2).	Loosen and remove.	
8. Control line (8) and two gaskets (3).	Remove	Discard two gaskets (3).
B. INSPECTION.		
9. Control line (8).	a. Inspect for: 1. Cracks. 2. Leaks. 3. Kinks. b. Blow air through to see that line is not clogged.	Replace if necessary.
C. INSTALLATION.		
10. Control line (8) and two new gaskets (3).	a. Attach to ratio selector (4) using three bolts (1) and washers (2). b. Attach to transmission (10) using three bolts (11).	
11. Six bolts (1) and (11).	Tighten to 18 lb-ft (24 N·m) using torque wrench.	
12. Grommet (9).	Install.	
13. Access plate (12).	Install.	
14. Ten screws (13).	Install and tighten.	
15. Retainer (7).	Install.	
16. Two screws (5) and washers (6).	Install and tighten.	

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued) .

NOTE

Follow on maintenance action required:

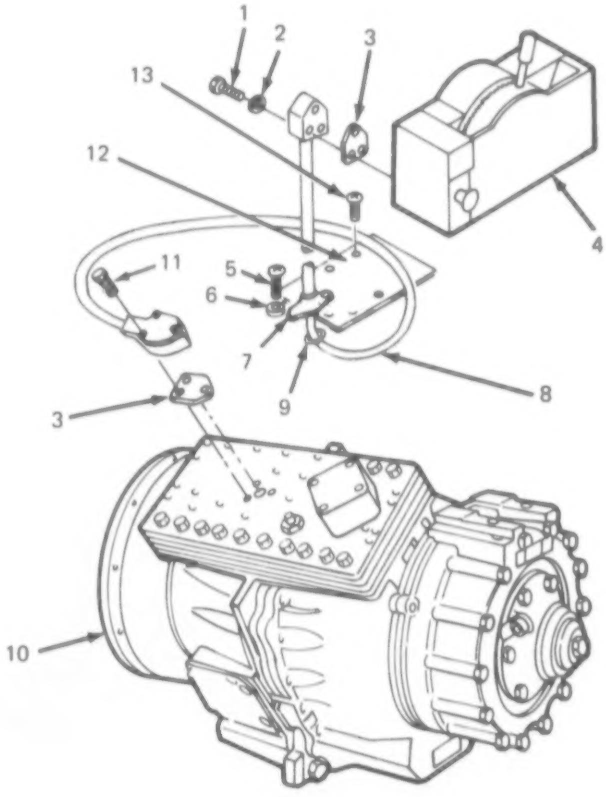
Close drain valve on air reservoir; (refer to para 9-13D).

D. CHECKING FOR LEAKS .

LOCATION/ITEM	ACTION	REMARKS
17. Engine.	Start up (See TM9-2320-273-10).	
18. CAB/Air charging valve.	Push in and charge until system reaches 65 psi (448 kPa).	When system reaches 65 psi, valve will stay in without being held.

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET (2)
4. RATIO SELECTOR
5. SCREW (2)
6. WASHER (2)
7. RETAINER
8. CONTROL LINE
9. GROMMET
10. TRANSMISSION
11. BOLT (3)
12. ACCESS PLATE
13. SCREW (10)



TA 074861

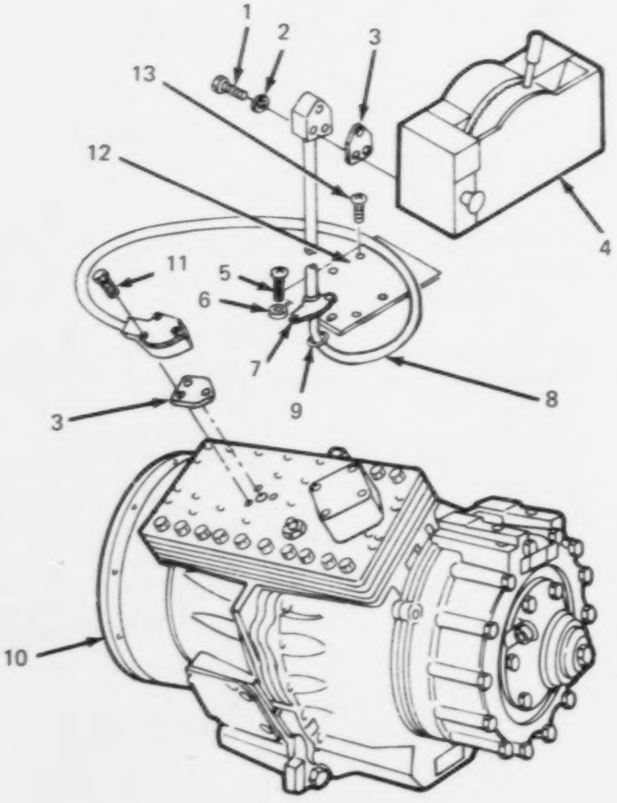
TRANSMISSION .

6-11. PNEUMATIC CONTROL LINE MAINTENANCE (Continued) .

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING FOR LEAKS (Continued).		
19. Control line (8).	Check for leaks, using soap solution.	

LEGEND:

1. BOLT (3)
2. WASHER (3)
3. GASKET (2)
4. RATIO SELECTOR
5. SCREW (2)
6. WASHER (2)
7. RETAINER
8. CONTROL LINE
9. GROMMET
10. TRANSMISSION
11. BOLT (3)
12. ACCESS PLATE
13. SCREW (10)



TA 074862

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TRANSMISSION.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(8)
b. Inspection of Lines and Fittings.	(2)
c. Lubrication of Ratio Selector.	(5)
d. Installation.	(8)
e. Operational Check.	(5)
	28 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

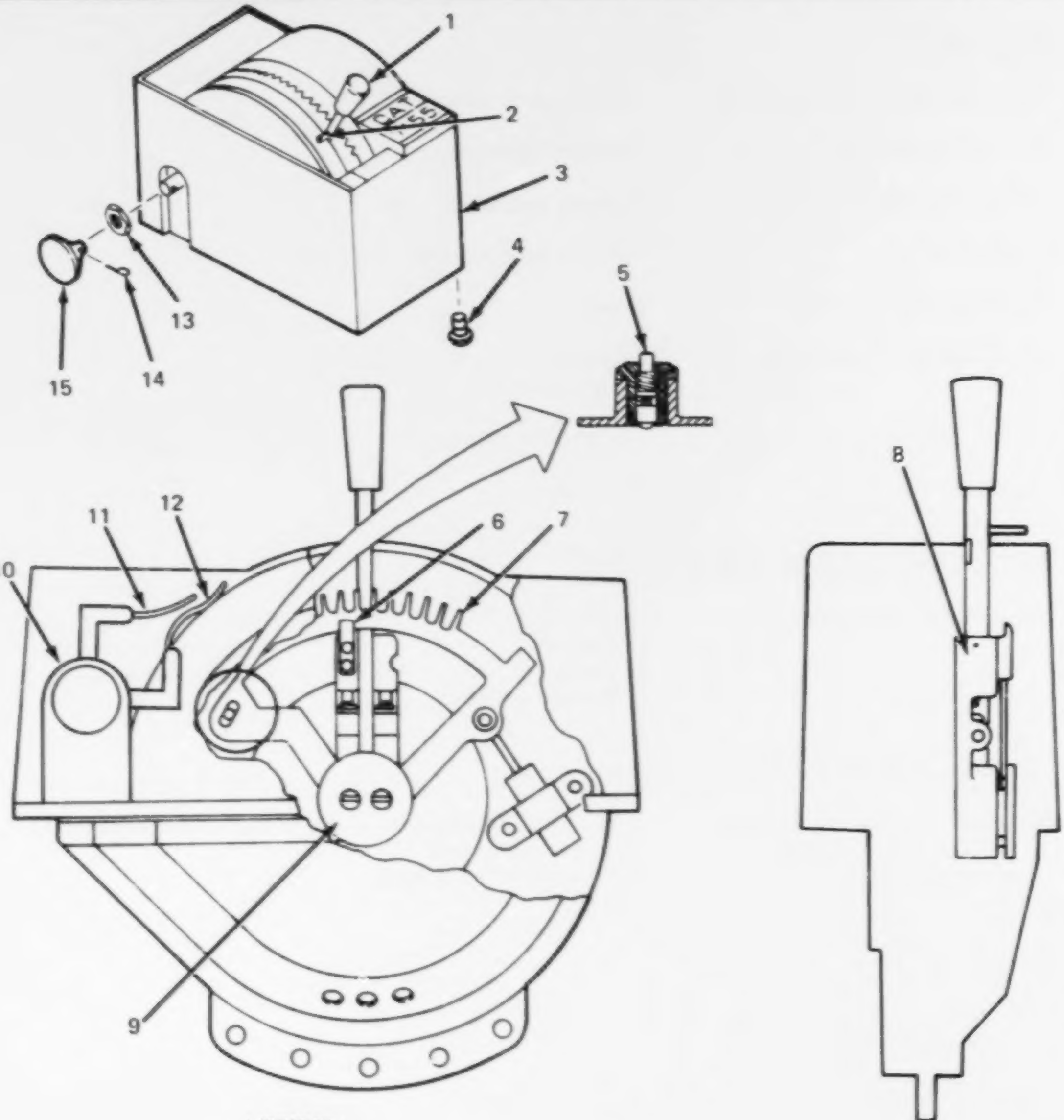
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. KNOB
2. INDICATOR
3. HOUSING
4. SCREW (4)
5. PLUNGER
6. GUIDE
7. INHIBITOR PLATE
8. BASE
9. RETAINER
10. VALVE
11. AIR LINE
12. AIR LINE
13. NUT
14. PIN
15. KNOB

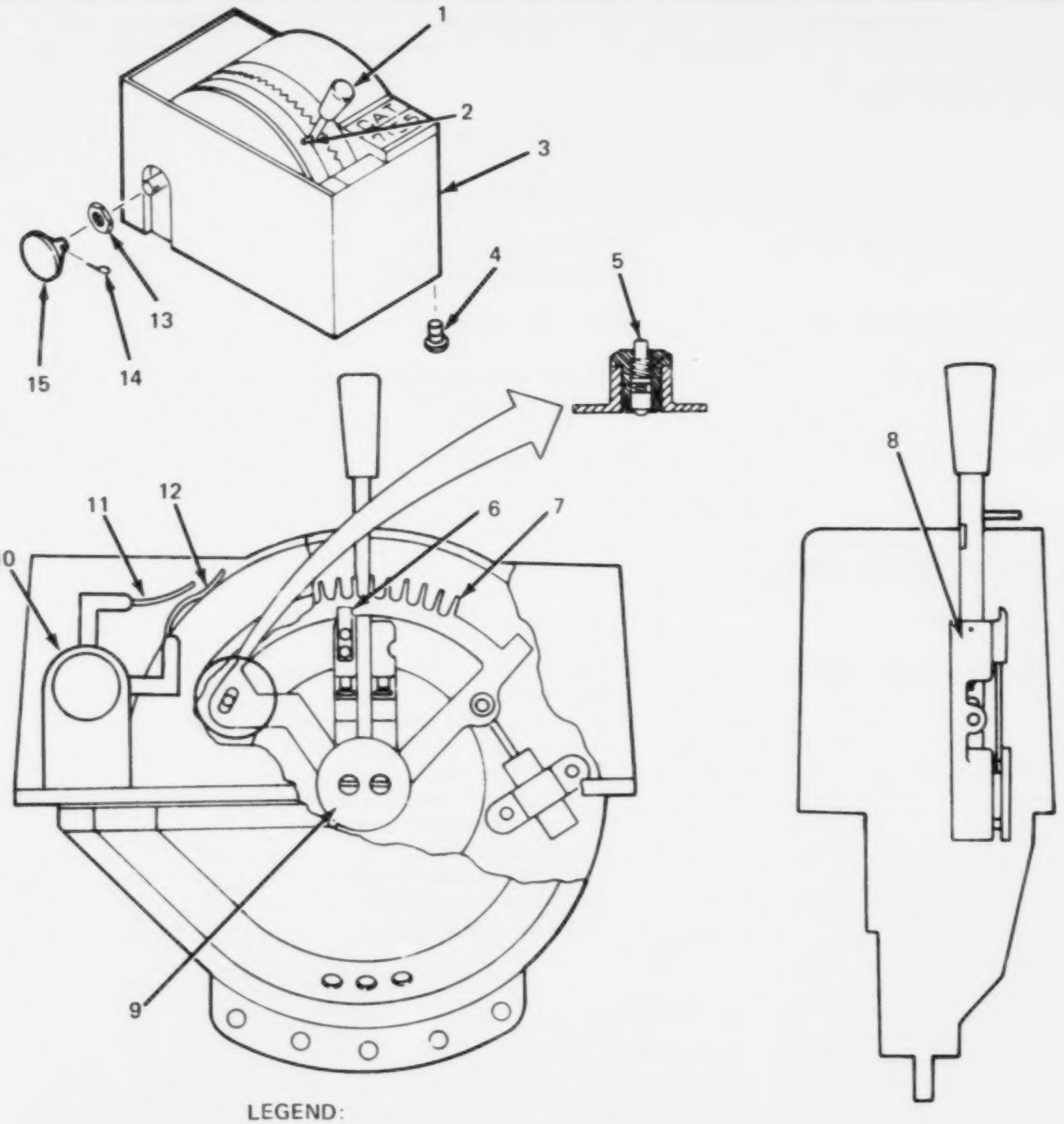
TA 074863

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Knob (1) and indicator (2).	Unscrew and remove.	
2. Four screws (4).	Unscrew and remove.	
3. Housing (3).	Remove and lay on side.	
4. Pin (14).	Remove with hammer and punch.	
5. Knob (15).	Remove.	
6. Air lines (11) and (12).	Unscrew from valve (10), tag and remove.	
7. Nut (13).	Loosen and remove.	
8. Valve (10).	Remove.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (11) and (12).	Inspect for: a. Cracks. b. Leaks. c. Damaged threads.	Also check threads on valve (10) for damage. Replace as necessary.
C. LUBRICATION OF RATIO SELECTOR.		
10. Inhibitor plate (7), retainer (9), base (8), guide (6) and plunger (5).	Spray surfaces between these items any time sticking becomes evident.	See LO 9-2320-273-12.

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. KNOB
2. INDICATOR
3. HOUSING
4. SCREW (4)
5. PLUNGER
6. GUIDE
7. INHIBITOR PLATE
8. BASE
9. RETAINER
10. VALVE
11. AIR LINE
12. AIR LINE
13. NUT
14. PIN
15. KNOB

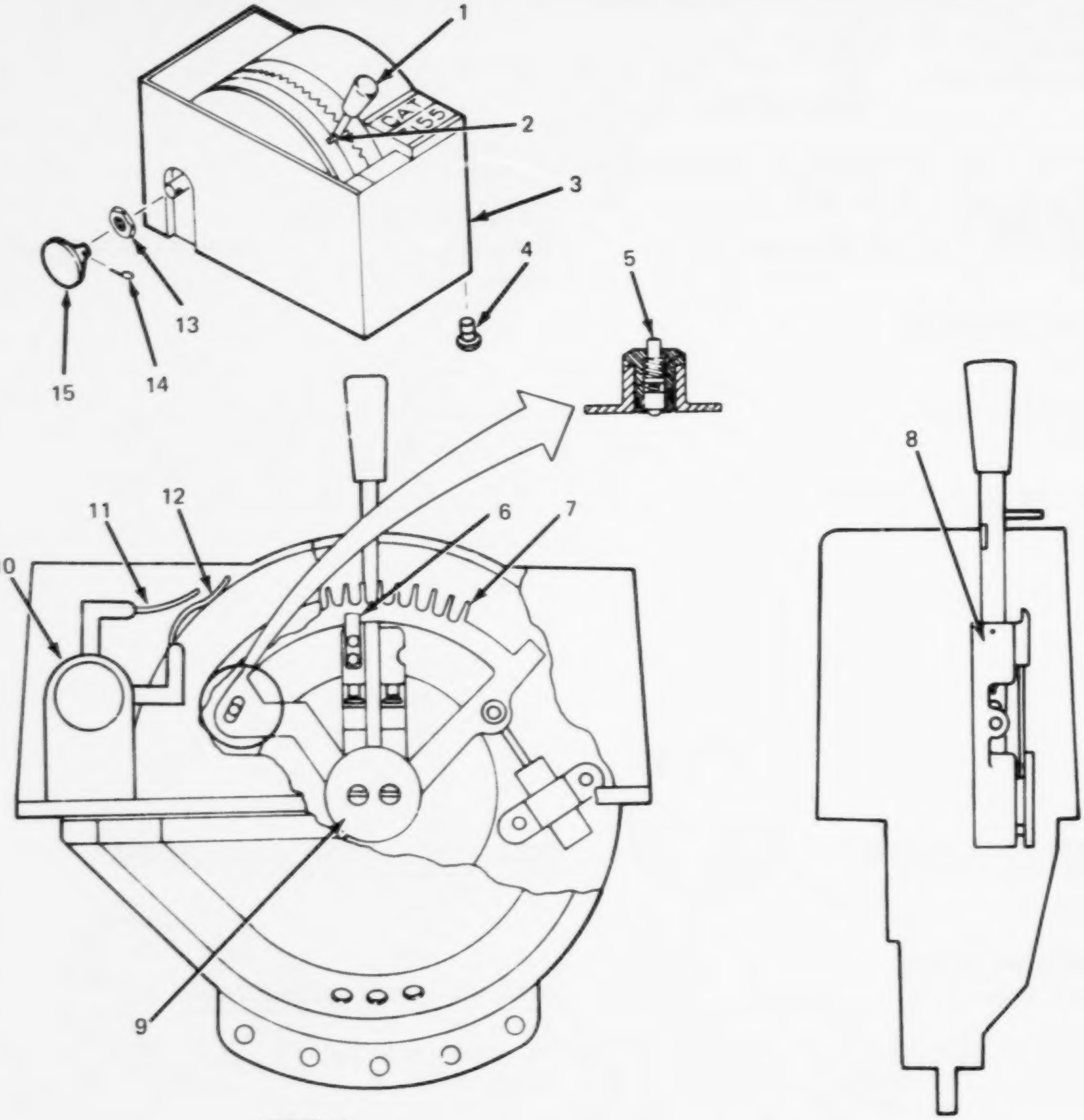
TA 074864

6-12. RATIO SELECTOR AND AIR CHARGING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
11. Valve (10).	Put in place.	
12. Nut (13).	Screw on and tighten.	
13. Knob (15).	a. Place on valve (10). b. Attach with pin (14).	
14. Air lines (11) and (12).	Screw onto fittings.	
15. Housing (3).	a. Attach with four screws (4). b. Tighten screws (4).	
16. Knob (1) and indicator (2).	Screw in and tighten.	
E. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10).	
18. Air charging valve knob (15).	a. Push knob in with air pressure below 65 psi (448 kPa). It should pop out when released. b. Push knob in with air pressure above 65 psi (448 kPa). It should stay in and the sound of the transmission engaging should be evident. c. Test drive vehicle. Shifts should be smooth with no evidence of sticking.	

6-12. AIR CHARGING - VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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9
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LEGEND:

1. KNOB
2. INDICATOR
3. HOUSING
4. SCREW (4)
5. PLUNGER
6. GUIDE
7. INHIBITOR PLATE
8. BASE
9. RETAINER
10. VALVE
11. AIR LINE
12. AIR LINE
13. NUT
14. PIN
15. KNOB

TA 074865

TRANSMISSION .

6-13. SPEEDOMETER CABLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
c. Operational check.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 5-7.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

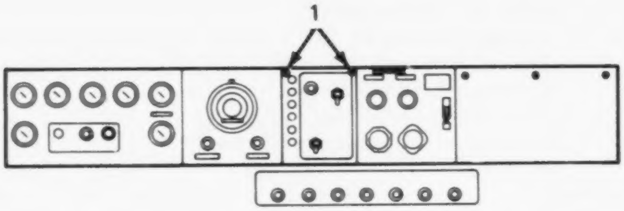
GENERAL SAFETY INSTRUCTIONS

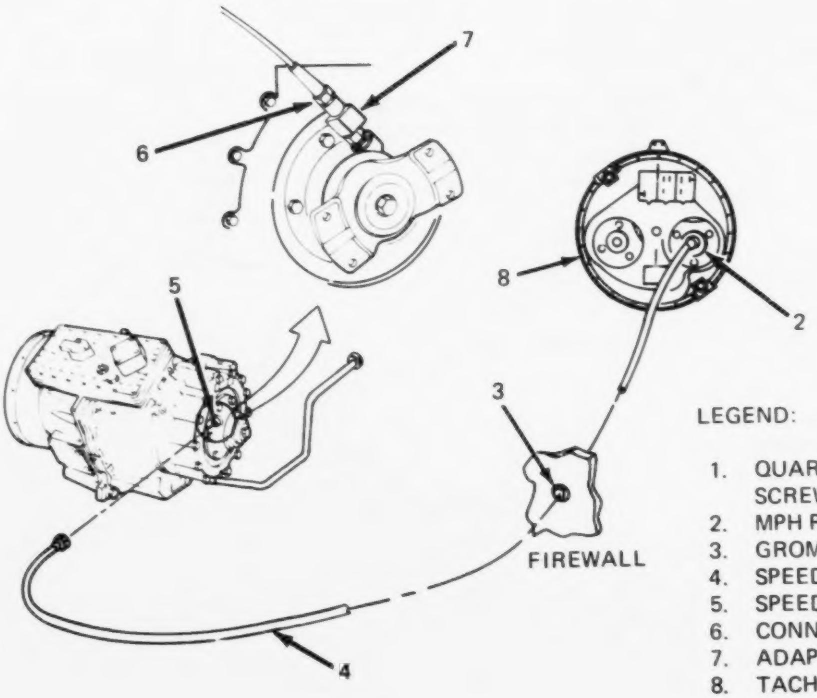
Engine Off.
Transmission in Neutral.
Park Brake Set.

TRANSMISSION.

6-13. SPEEDOMETER CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen and lower panel.	
2. Speedometer cable (4).	a. Disconnect from km/h MPH connection (2) on back of tachograph (8).	
	b. Unscrew connector (6) from speedometer drive (5) at transmission.	M916/M920 – Unscrew from adapter (7) at speedometer drive (5).
	c. Pull thru grommet (3) on firewall.	





LEGEND:

1. QUARTER-TURN SCREW (2)
2. MPH PORT
3. GROMMET
4. SPEEDOMETER CABLE
5. SPEEDOMETER DRIVE
6. CONNECTOR
7. ADAPTER
8. TACHOGRAPH

TA 074866

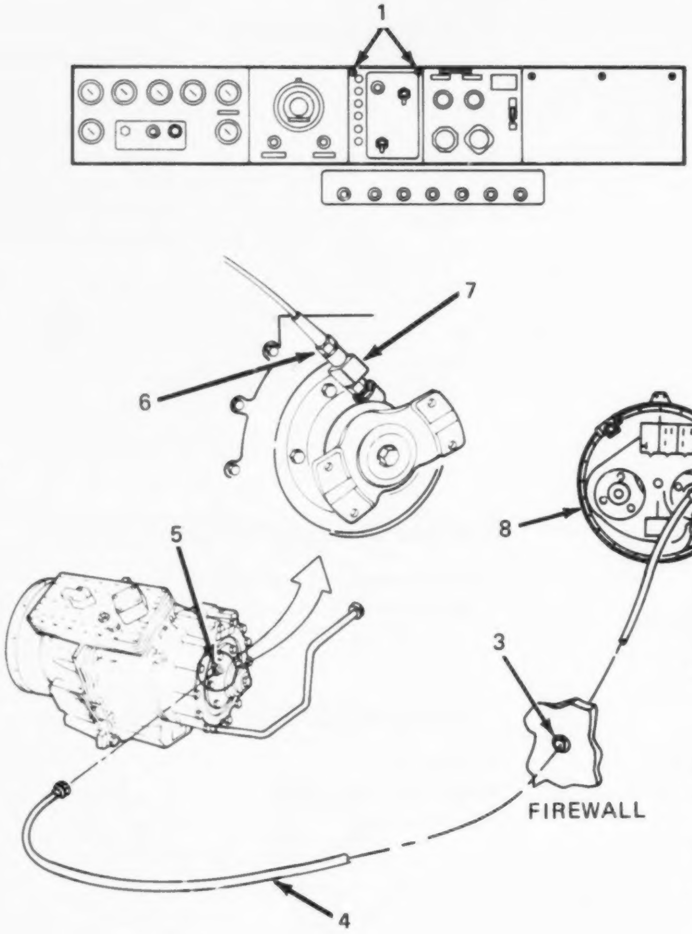
TRANSMISSION.

6-13. SPEEDOMETER CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Adapter (7).	Unscrew and remove from speedometer drive (5).	(M916/M920 only).
B. INSTALLATION.		
4. Adapter (7).	Install on speedometer drive (5).	(M916/M920 only).
5. Speedometer cable (4).	a. Plug into speedometer drive (5) or adapter (7). Tighten connector (6). b. Thread free end through grommet (3) on firewall. c. Connect to MPH port (2) on back of tachograph (8).	
6. Two quarter-turn screws (1).	Close panel and tighten screws.	
C. OPERATIONAL CHECK.		
7. Vehicle.	Road test. Check tachograph (8) for appropriate road speed indication and responsiveness to changes in speed.	

6-13. SPEEDOMETER CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (2)
2. MPH PORT
3. GROMMET
4. SPEEDOMETER CABLE
5. SPEEDOMETER DRIVE
6. CONNECTOR
7. ADAPTER
8. TACHOGRAPH

TA 074867

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(60)
b. Installation.	(60)
c. Operational Check.	(30)
	150 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATION

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Masking Tape.
Marking Pen.
Cable Ties (8), SST4S (06383).
Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-23A.	Fuel Tank Removed.
4-30A.	Ether Cylinder Removed.
5-37A.	Batteries Disconnected.
6-11A.	Floor Access Plate Removed.
9-16A.	Supply Air Resevoir Removed. (M916 thru M920 Only).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
Temperature of Transmission Control 0°F (-17.8°C) or Less for Testing.

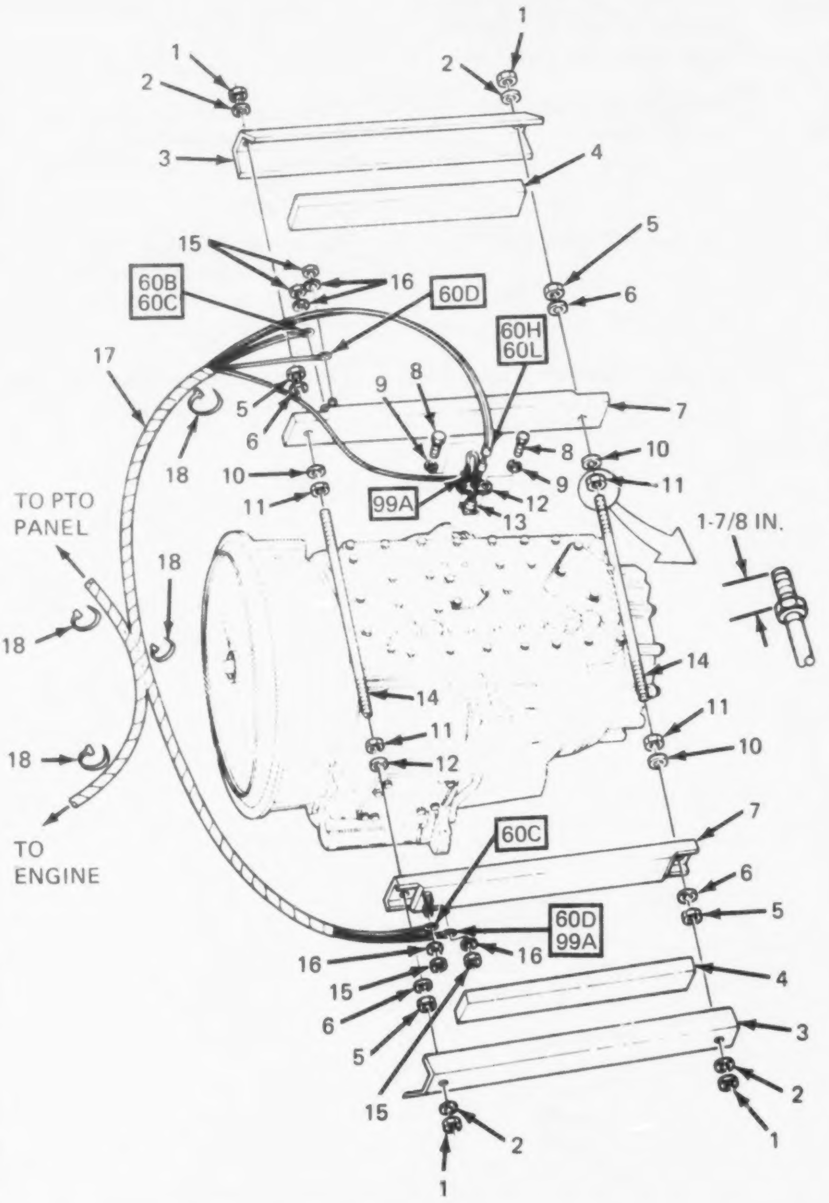
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four nuts (1) and washers (2).	Unscrew and remove two heater covers (3) and insulation strips (4).	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99A
TO PTO PANEL
TO ENGINE
1-7/8 IN.

LEGEND:

1. NUT (4)
2. WASHER (4)
3. HEATER COVER (2)
4. INSULATION STRIP (2)
5. NUT (4)
6. WASHER (4)
7. HEATER (2)
8. BOLT (2)
9. WASHER (2)
10. WASHER (4)
11. NUT (4)
12. PLATE
13. SWITCH
14. ROD (2)
15. NUT (4)
16. WASHER (4)
17. HARNESS
18. CABLE TIE (4)

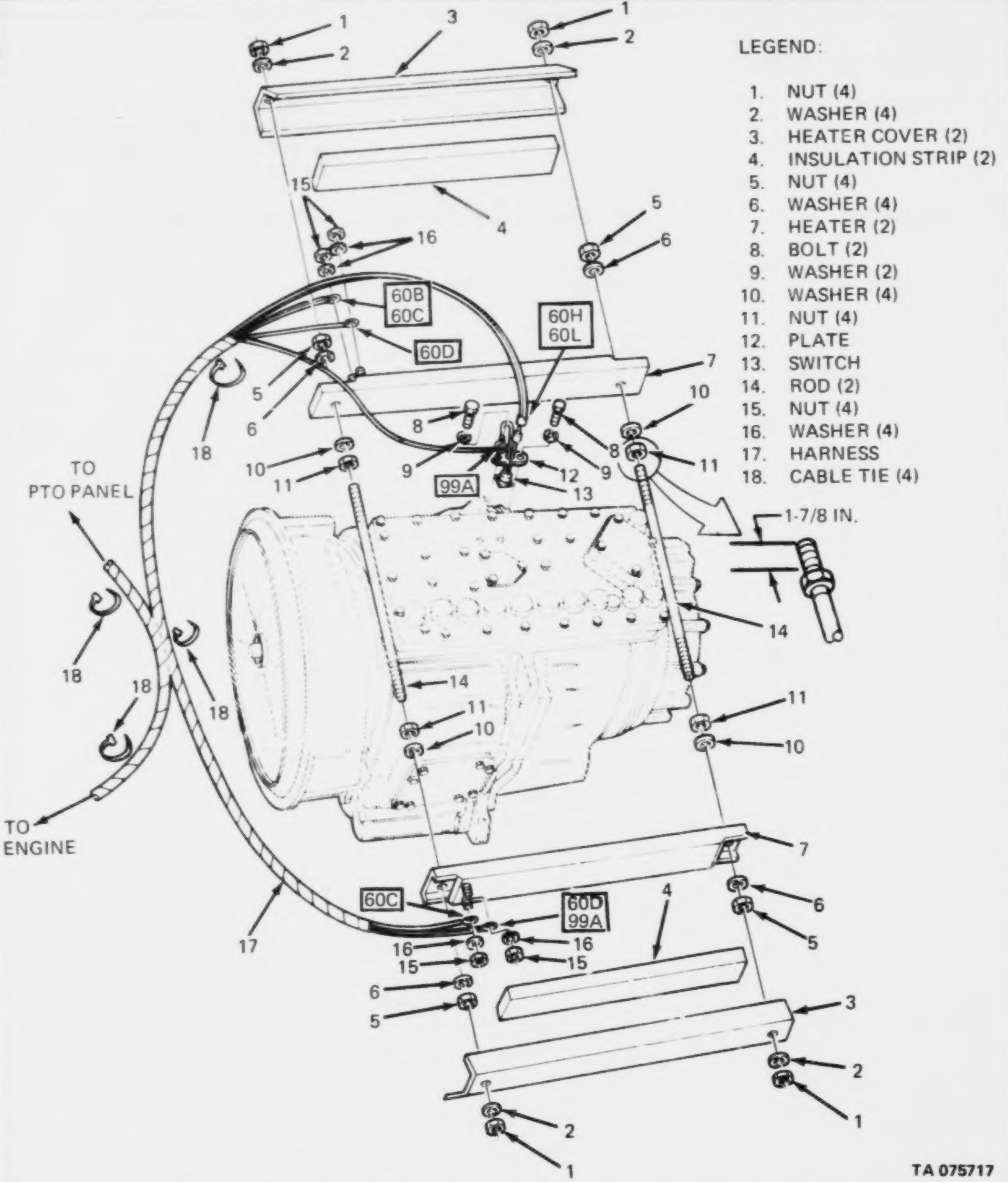
TA 075716

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Four nuts (15) and washers (16).	Unscrew and remove four wires from two heaters (7).	Wires are contained in harness (17). Tag for reassembly.
3. Two nuts (5) and washers (6).	Unscrew and remove bottom heater (7) and two washers (10) from two rods (14).	Remove only the bottom heater at this time.
4. Top heater (7), two nuts (5), washers (6), rods (14), washers (10), and four nuts (11).	Remove as an assembly from transmission.	After assembly has been removed, disassemble nuts, washers, and heater from rods.
5. Harness (17).	Unplug from switch (13).	Tag for reassembly. One terminal from harness (17) will still be connected to switch (13).
6. Two bolts (8) and washers (9).	Unscrew and remove harness (17), plate (12), and switch (13) from transmission.	Tag one terminal from harness (17) for reassembly.
7. Four cable ties (18).	Cut and remove from harness (17).	Discard.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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TO PTO PANEL
TO ENGINE
1-7/8 IN.
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18

LEGEND:

1. NUT (4)
2. WASHER (4)
3. HEATER COVER (2)
4. INSULATION STRIP (2)
5. NUT (4)
6. WASHER (4)
7. HEATER (2)
8. BOLT (2)
9. WASHER (2)
10. WASHER (4)
11. NUT (4)
12. PLATE
13. SWITCH
14. ROD (2)
15. NUT (4)
16. WASHER (4)
17. HARNESS
18. CABLE TIE (4)

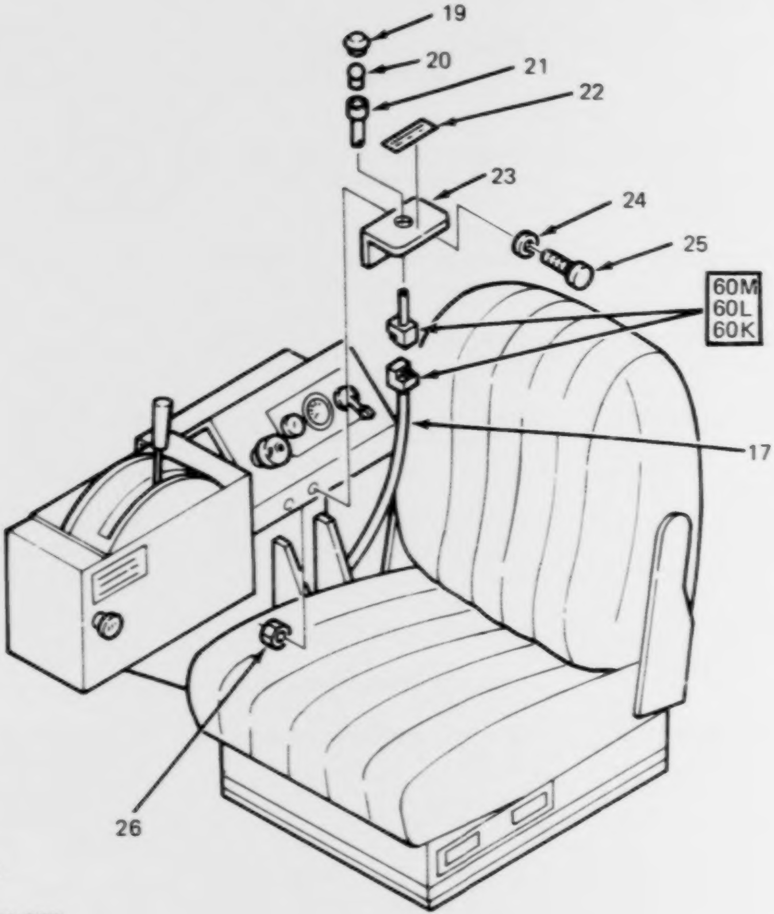
TA 075717

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
8. Harness (17).	Unplug from harness (21).	**Inside cab by driver's seat at ratio selector support (M915), or at PTO console (M916 thru M920). Tag for assembly.**
9. Harness (21).	Pull down to remove from bracket (23).	**This step required to replace lamp.**
10. Lens (19).	Push up from bottom to remove from bracket (23).	
11. Two bolts (25), washers (24), and nuts (26).	Unscrew and remove bracket (23) with decal (22) attached.	

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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26

LEGEND:

17. HARNESS
19. LENS
20. LAMP
21. HARNESS
22. DECAL
23. BRACKET
24. WASHER (2)
25, BOLT (2)
26. NUT (2)

TA 075718

TRANSMISSION.

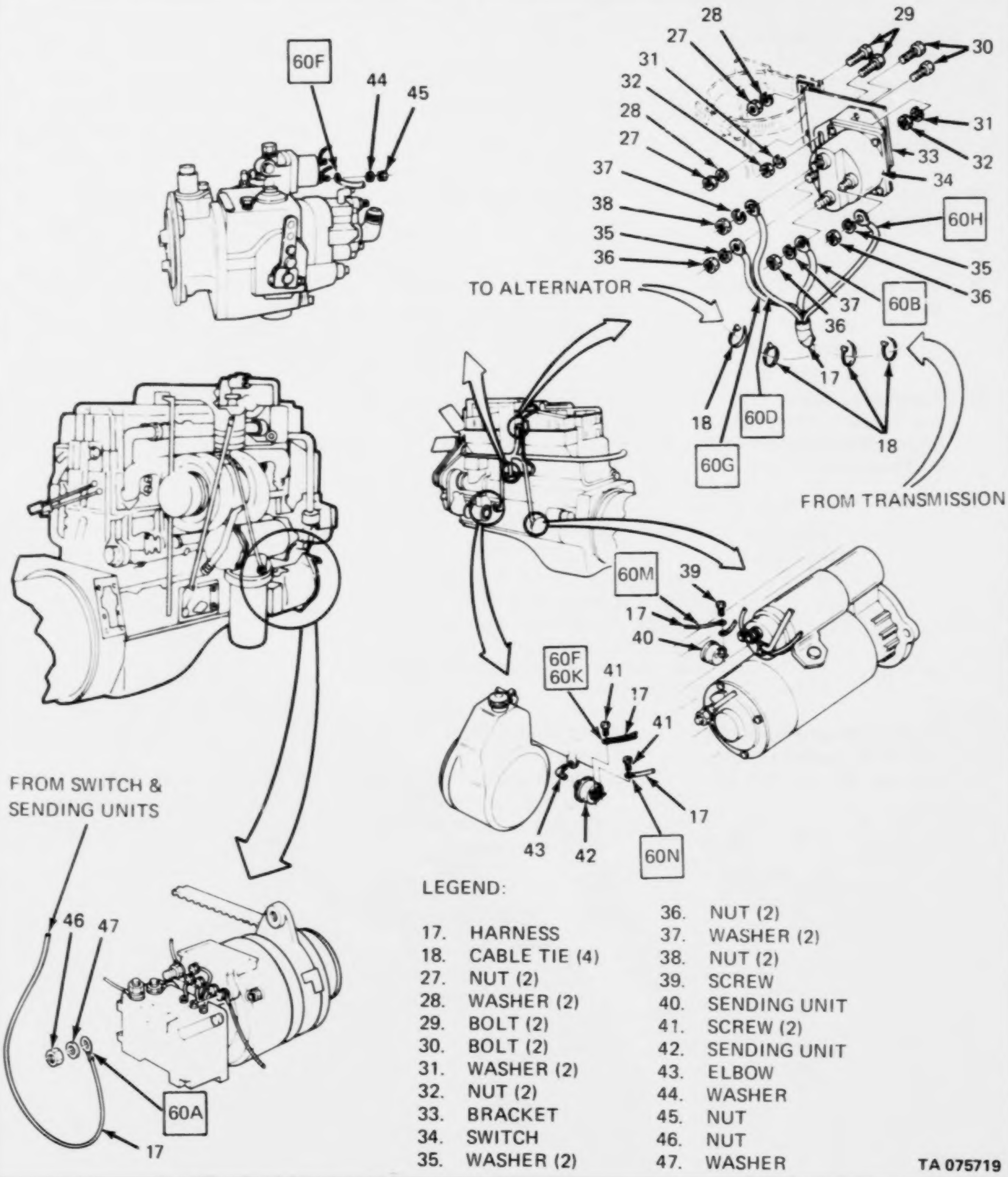
6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
12. Four cable ties (18).	Cut and remove.	Discard.
13. Screw (39).	Unscrew from sending unit (40) and remove one wire.	Near starter. Wire is contained in harness (17). Tag for assembly.
14. Two nuts (38), washers (37), nuts (37), and washers (35).	Unscrew and remove four wires from switch (34).	At ether quick-start bracket. Four wires are contained in harness (17). Tag for assembly.
15. Two bolts (30), washers (31) and nuts (32).	Unscrew and remove switch (34) from bracket (33).	
16. Two bolts (29), washers (28), and nuts (27).	Unscrew and remove bracket (33).	
17. Nut (45) and washer (44).	Unscrew and remove one wire.	At fuel pump. Wire is contained in harness (17). Tag for assembly.
18. Two screws (41).	Unscrew and remove two wires from sending unit (42).	Near power steering pump. Wires are contained in harness (17). Tag for assembly.
19. Sending unit (42).	Unscrew from elbow (43).	
20. Elbow (43).	Unscrew from engine block.	
21. Nut (46), and washer (47).	Unscrew and remove one wire.	On positive post of alternator. Wire is contained in harness (17) which is now completely removed from vehicle. Tag for assembly.

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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TO ALTERNATOR
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60D
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60G
FROM TRANSMISSION
60M
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60F
60K
41
17
41
17
43
42
60N
FROM SWITCH &
SENDING UNITS
46
47
60A
17
TA 075719

LEGEND:

17. HARNESS
18. CABLE TIE (4)
27. NUT (2)
28. WASHER (2)
29. BOLT (2)
30. BOLT (2)
31. WASHER (2)
32. NUT (2)
33. BRACKET
34. SWITCH
35. WASHER (2)
36. NUT (2)
37. WASHER (2)
38. NUT (2)
39. SCREW
40. SENDING UNIT
41. SCREW (2)
42. SENDING UNIT
43. ELBOW
44. WASHER
45. NUT
46. NUT
47. WASHER

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
22. Two nuts (11).	Screw one nut (11) onto each of two rods (14).	Nut must be exactly 1 7/8 inches from end of rod for proper installation clearance (see exploded view).
23. Two washers (10) and one heater (7).	Slide onto two rods (14).	At same end of rods you installed nuts (11) on in step (22).
24. Two nuts (5) and washers (6).	Install on two rods (14) and adjust down to contact heater (7).	Check for 1 7/8 inch measurement again from nuts (11) to end of rods (14). Adjust if necessary.
25. Assembled heater (7), two nuts (11), nuts (5), washers (6), washers (10), and rods (14).	Position on top edge of transmission.	

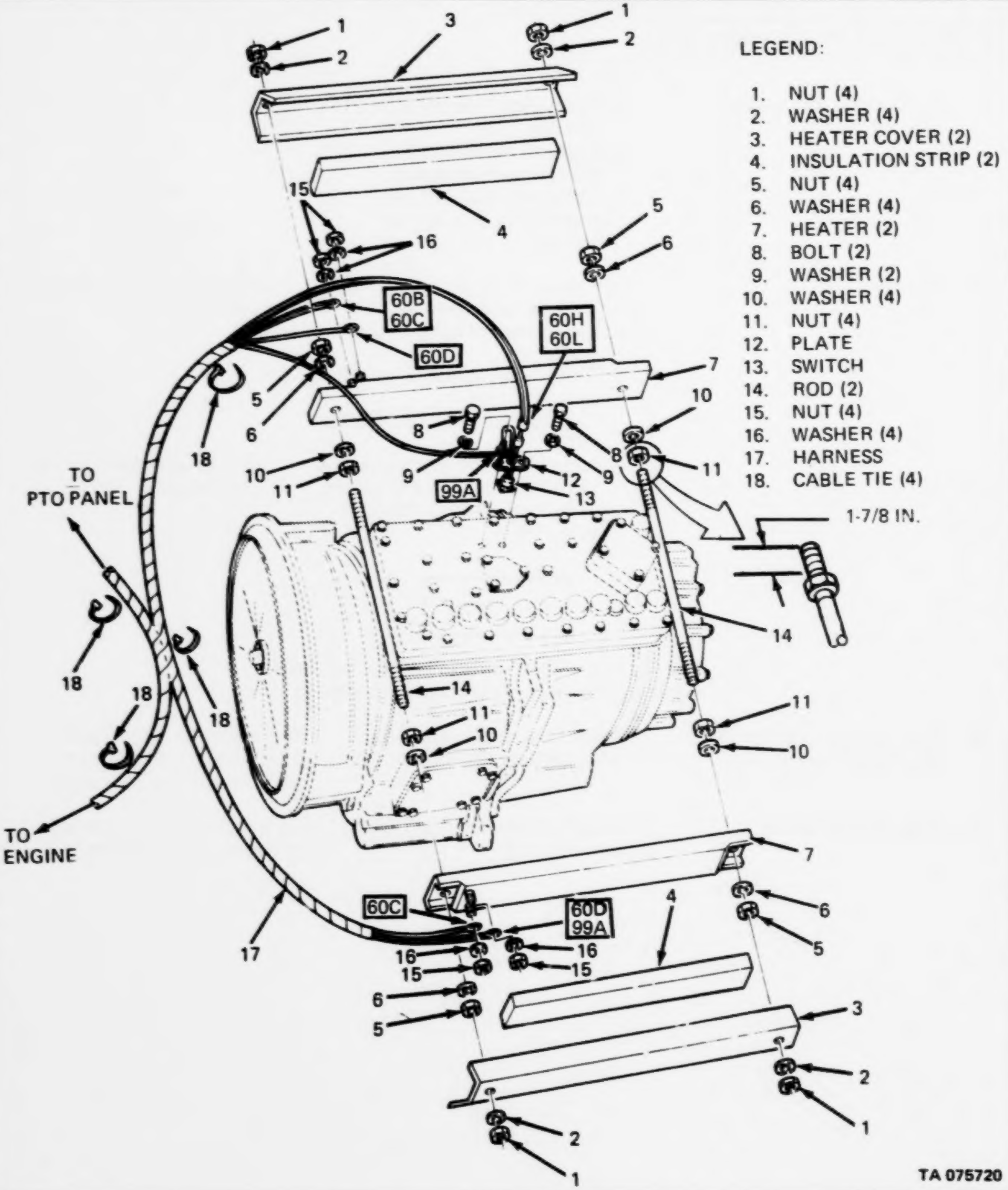
CAUTION

Do not over tighten nuts (5) or (11). Adjust to retain heaters (7) snugly against transmission control. Over tightening will cause heaters to distort and pull away from control block on transmission.

LOCATION/ITEM	ACTION	REMARKS
26. Second heater (7), two nuts (11), washers (10), washers (6), and nuts (5).	a. Install at bottom of two rods (14).	
	b. Tighten two bottom nuts (11) and two bottom nuts (5) to snug two heaters to transmission.	If heater(s) start to bow, loosen nuts (11) until heater(s) are straight, then lock in place with nuts (11).

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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18
TO PTO PANEL
1-7/8 IN.
14
TO ENGINE
17
60C
60D
99A
16
15
6
5
3
2
1

LEGEND:

1. NUT (4)
2. WASHER (4)
3. HEATER COVER (2)
4. INSULATION STRIP (2)
5. NUT (4)
6. WASHER (4)
7. HEATER (2)
8. BOLT (2)
9. WASHER (2)
10. WASHER (4)
11. NUT (4)
12. PLATE
13. SWITCH
14. ROD (2)
15. NUT (4)
16. WASHER (4)
17. HARNESS
18. CABLE TIE (4)

TA 075720

TRANSMISSION.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

B. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
27. Switch (13) and plate (12).	a. Put switch (13) thru center of plate (12). b. Position plate (12) on transmission as shown. c. Install one bolt (8) and washer (9), but do not tighten.	
28. Harness (17).	a. Position one wire from harness and one wire from switch (13).	Install as tagged during disassembly.
	b. Install second bolt (8) and washer (9). c. Tighten two bolts (8) to 32 lb-ft (43 N·m). d. Plug harness (17) into switch (13).	
	e. Install four harness wires, two to each heater (7) and secure with four washers (16) and nuts (15).	Install as tagged during disassembly.

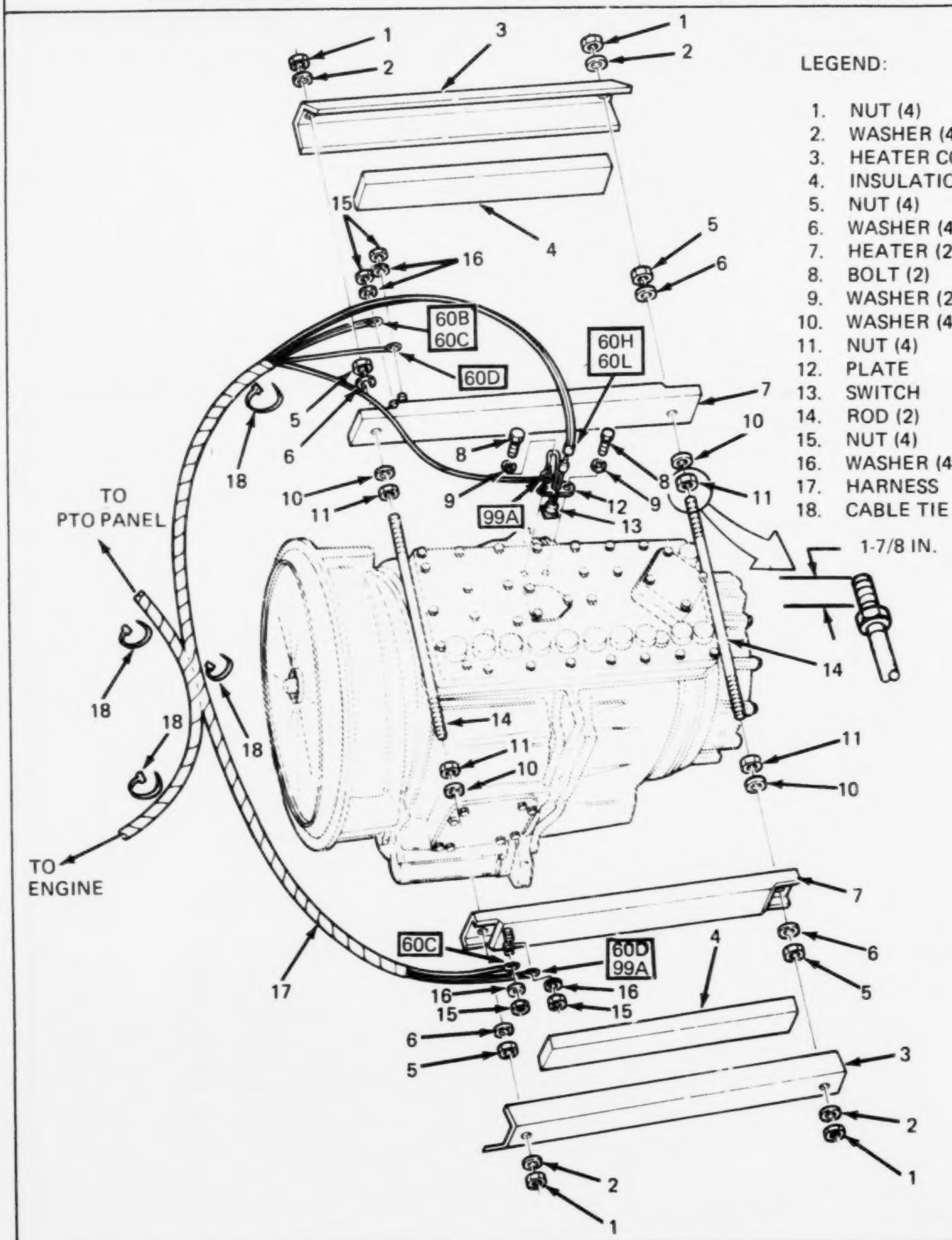
CAUTION

Do not over tighten nuts (1) as this will cause bowing of heaters (7) and heater covers (3).

LOCATION/ITEM	ACTION	REMARKS
29. Two insulation strips (4) and heater covers (3).	Position as shown and secure with washers (2) and nuts (1).	Set insulation strips inside heater covers. Slide heater covers onto two rods (14).
30. Four new cable ties (18).	Install around harness (17) to prevent slack.	At transmission air line and at engine or chassis harness.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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99A
TO
PTO PANEL
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1-7/8 IN.
TO
ENGINE
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LEGEND:

1. NUT (4)
2. WASHER (4)
3. HEATER COVER (2)
4. INSULATION STRIP (2)
5. NUT (4)
6. WASHER (4)
7. HEATER (2)
8. BOLT (2)
9. WASHER (2)
10. WASHER (4)
11. NUT (4)
12. PLATE
13. SWITCH
14. ROD (2)
15. NUT (4)
16. WASHER (4)
17. HARNESS
18. CABLE TIE (4)

TA 075721

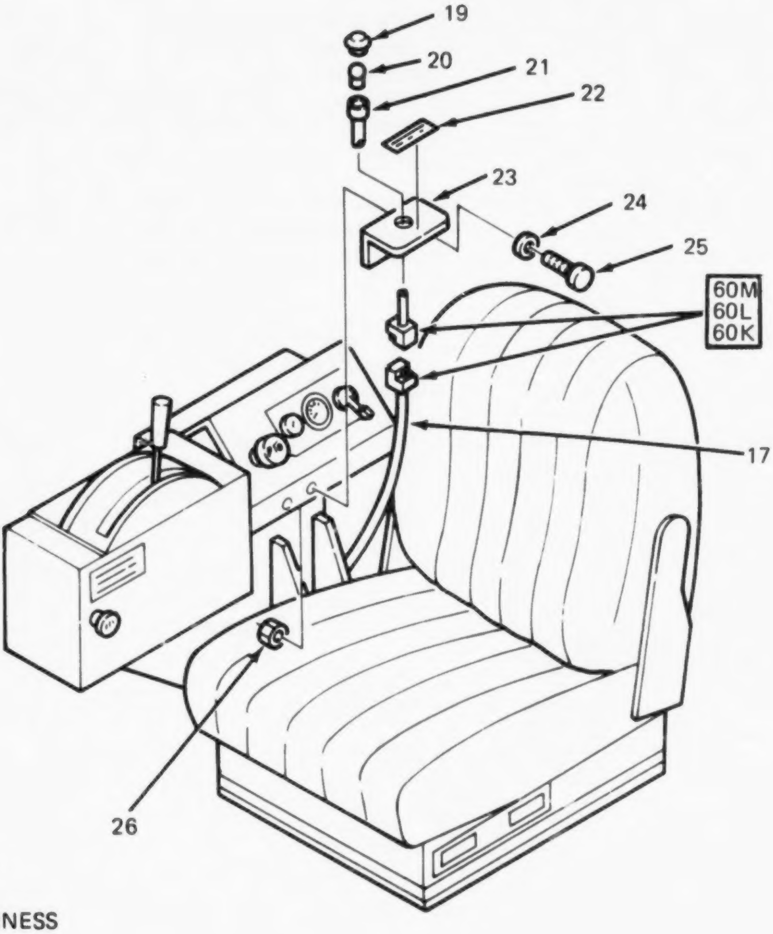
6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

B. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
31. Bracket (23).	Install to PTO console (M916 thru M920) or to ratio selector support (M915) with two bolts (25), washers (24), and nuts (26).	
32. Lens (19).	Press down into bracket (23).	
33. Lamp (20).	a. Plug into harness (21). b. Press into lens (19).	
34. Harness (21).	Plug into harness (17).	Install as tagged at disassembly.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

17. HARNESS
19. LENS
20. LAMP
21. HARNESS
22. DECAL
23. BRACKET
24. WASHER (2)
25, BOLT (2)
26. NUT (2)

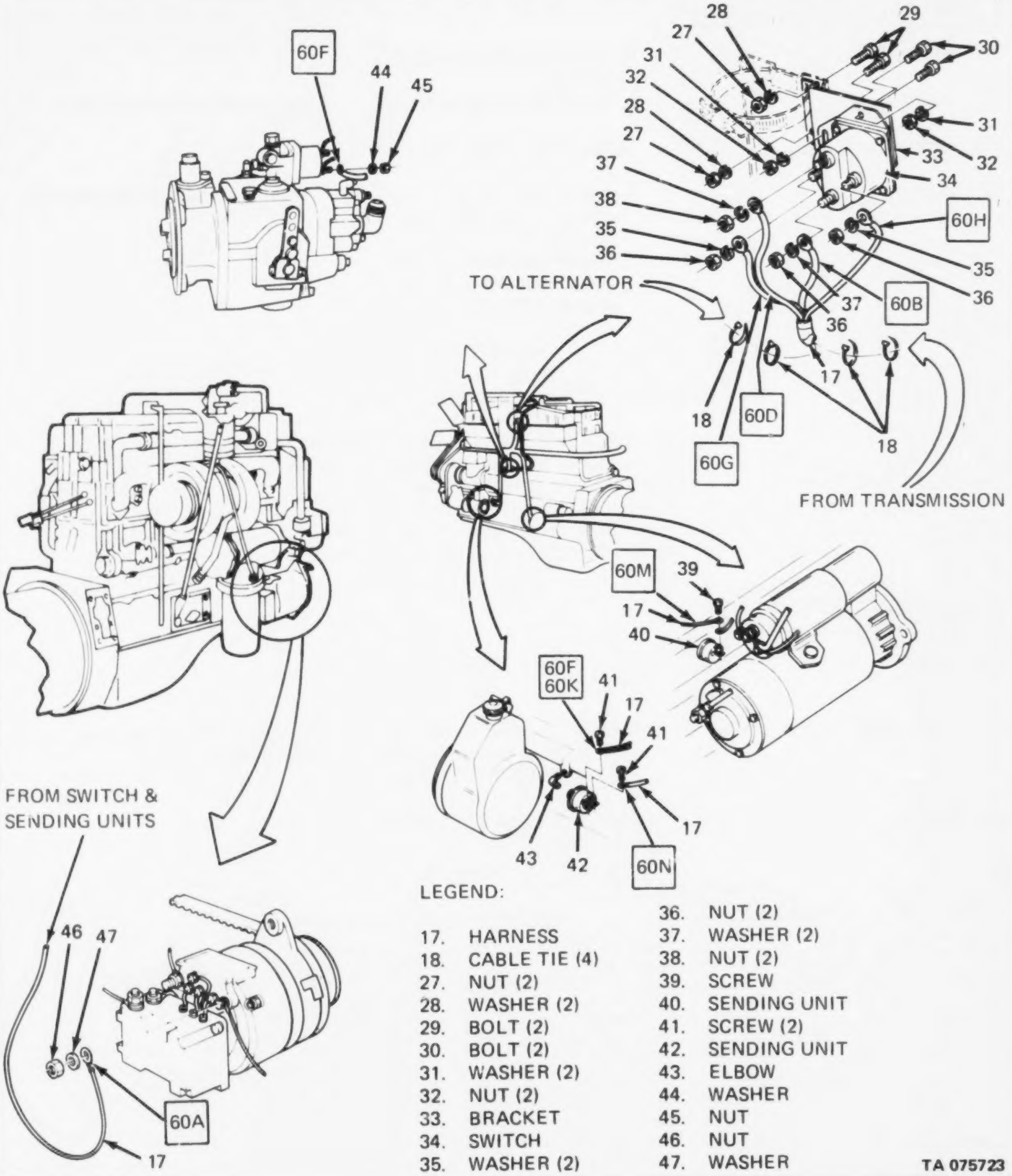
TA 075722

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
35. Harness (17).	a. Route along engine and secure with four new cable ties (18).	Left side. Install as needed to prevent slack.
	b. Install one wire to sending unit (40) with screws (39).	Near starter. Install as tagged at disassembly.
36. Bracket (33).	Position at ether quick-start bracket and install with two bolts (29), washers (28) and nuts (27).	
37. Switch (34).	Install to bracket (33) with two bolts (30), washers (31), and nuts (32).	
38. Harness (17).	a. Install four wires to four terminals on switch (34) with two nuts (38), washers (37), nuts (36), and washers (35).	Install as tagged at disassembly.
	b. Install one wire to fuel pump and secure with nut (45) and washer (44).	Install as tagged at disassembly.

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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TO ALTERNATOR
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60D
60G
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FROM TRANSMISSION
60M
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60F
60K
41
17
41
43
42
60N
17
FROM SWITCH &
SENDING UNITS
46
47
60A
17

LEGEND:

17. HARNESS
18. CABLE TIE (4)
27. NUT (2)
28. WASHER (2)
29. BOLT (2)
30. BOLT (2)
31. WASHER (2)
32. NUT (2)
33. BRACKET
34. SWITCH
35. WASHER (2)
36. NUT (2)
37. WASHER (2)
38. NUT (2)
39. SCREW
40. SENDING UNIT
41. SCREW (2)
42. SENDING UNIT
43. ELBOW
44. WASHER
45. NUT
46. NUT
47. WASHER

TA 075723

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

B. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
39. Elbow (43).	a. Coat threads with liquid teflon. b. Screw into engine block.	 Near power steering pump.
40. Sending unit (42).	Screw onto elbow (43).	
41. Harness (17).	a. Install two wires to sending unit (42) with two screws (41). b. Install one wire to alternator positive post with washer (47) and nut (46).	Install as tagged at disassembly.

NOTE

Follow-on maintenance action required:

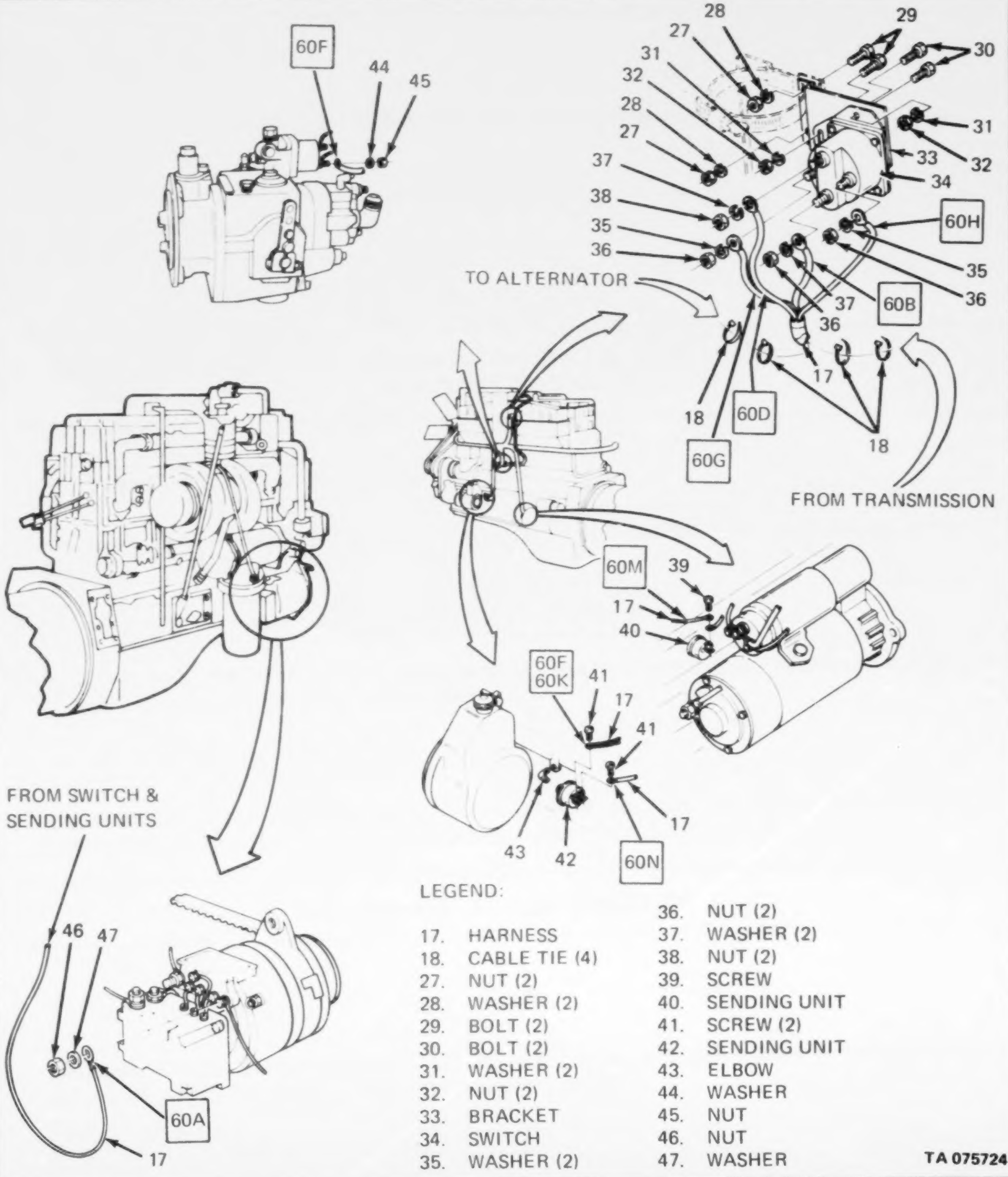
a. Install fuel tank; refer to para 4-23B and C.
b. Install supply air reservoir (M916 thru M920 only); refer to para 9-16B and C.
c. Connect batteries; refer to para 5-37B.
d. Install floor access plate; refer to para 6-11C.
e. Install ether cylinder; refer to para 4-30B and C.

C. OPERATIONAL CHECK.

LOCATION/ITEM	ACTION	REMARKS
42. Engine.	Start up (see TM 9-2320-273-10).	
43. Lamp (20).	Should light and remain on until control temperature is in excess of 0°F (-17.8°C).	See decal (22) for further instructions.
44. Engine.	Shut down (see TM 9-2320-273-10).	

6-14. TRANSMISSION CONTROL HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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TO ALTERNATOR
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FROM TRANSMISSION
60M
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60F
60K
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43
42
60N
FROM SWITCH &
SENDING UNITS
46
47
60A
17

LEGEND:

17. HARNESS
18. CABLE TIE (4)
27. NUT (2)
28. WASHER (2)
29. BOLT (2)
30. BOLT (2)
31. WASHER (2)
32. NUT (2)
33. BRACKET
34. SWITCH
35. WASHER (2)
36. NUT (2)
37. WASHER (2)
38. NUT (2)
39. SCREW
40. SENDING UNIT
41. SCREW (2)
42. SENDING UNIT
43. ELBOW
44. WASHER
45. NUT
46. NUT
47. WASHER

TA 075724

CHAPTER 7

POWER TRANSFER CASE MAINTENANCE

7-1. OVERVIEW.

This chapter provides you with the following information related to power transfer case maintenance:

a. All required special tools and equipment.

b. Other technical manuals.

c. Troubleshooting procedures.

d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

7-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

7-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

No special tools, TMDE and support equipment are required for the power transfer case maintenance procedures described in this chapter.

7-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

7-5. INTRODUCTION.

Troubleshooting procedures (table 7-1) are limited to those on-vehicle checks for which corrective actions are within the scope of Organizational Maintenance.

Table 7-1. Power Transfer Case Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

---

1. POWER TRANSFER CASE DOES NOT TURN FRONT AXLE PROPELLER SHAFT:

Disconnect control air supply line at power transfer case air chamber and check for air supply with differential lockup control valve switch in LOCK position.

a. Replace defective control valve (para 9-44).

b. Troubleshoot truck compressed air system (para 9-5).

c. If air control system is good, refer problem to Direct Support Maintenance.

2. EXCESSIVE HEAT BUILDUP:

Step 1. Check oil level in both the main case and the clutch housing for proper level.

Fill to proper level (para 7-8).

Step 2. Check oil cooler system for proper functioning.

Tighten fittings, clean cooling fins, replace pump (para 7-9).

3. LUBRICANT LEAKING:

Step 1. Check drain plugs for tightness.

Tighten drain plugs.

Step 2. Check for clogged or damaged breathers on clutch housing.

Replace breathers.

Step 3. Check for damaged gaskets or seals.

Refer problem to Direct Support Maintenance.

4. TRANSFER CASE NOISY (OIL LEVEL OKAY):

Refer problem to Direct Support Maintenance.

7-6. POWER TRANSFER CASE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil, 5 Qts (4.7 Liters) (Refer to Appendix C); OEA if Sub-zero Use.
Oil Funnel.
Container, 1.5 Gal (5.68 Liters).
Gaskets - 2 18108F (34632).
Plugs.
Liquid Teflon (Refer to Appendix C).
Cable Ties - 2 5963577-A (06383).
Masking Tape.
Marking Pen.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 7-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
7-8A.	Power Transfer Case Oil Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

7-6. POWER TRANSFER CASE MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Oil Service:	7-8	7-1
	A. Draining Oil.	7-8A	
	B. Replenishing Oil Supply.	7-8B	
	C. Checking for Leaks.	7-8C	
2.	Cooler System Maintenance:	7-9	7-1
	A. Removal.	7-9A	
	B. Cleaning and inspection.	7-9B	
	C. Installation.	7-9C	
	D. Operational Check.	7-9D	

Section III MAINTENANCE PROCEDURES

7-7. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the power transfer case. The scope of work is limited to oil service and cooler system maintenance.

NOTE

Maintenance procedures for the differential lockup control valve are given in Chapter 9, Section III, paragraph 9-44.

POWER TRANSFER CASE.

7-8. OIL SERVICE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Draining Oil.	(15)
b. Replenishing Oil Supply.	(15)
c. Checking for Leaks.	(15)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Oil Funnel.
Oil, 5 Qts (4.7 Liters) (Refer to Appendix C); OEA if Sub-zero Use.
Container, 1.5 Gal (5.68 Liters).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 7-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

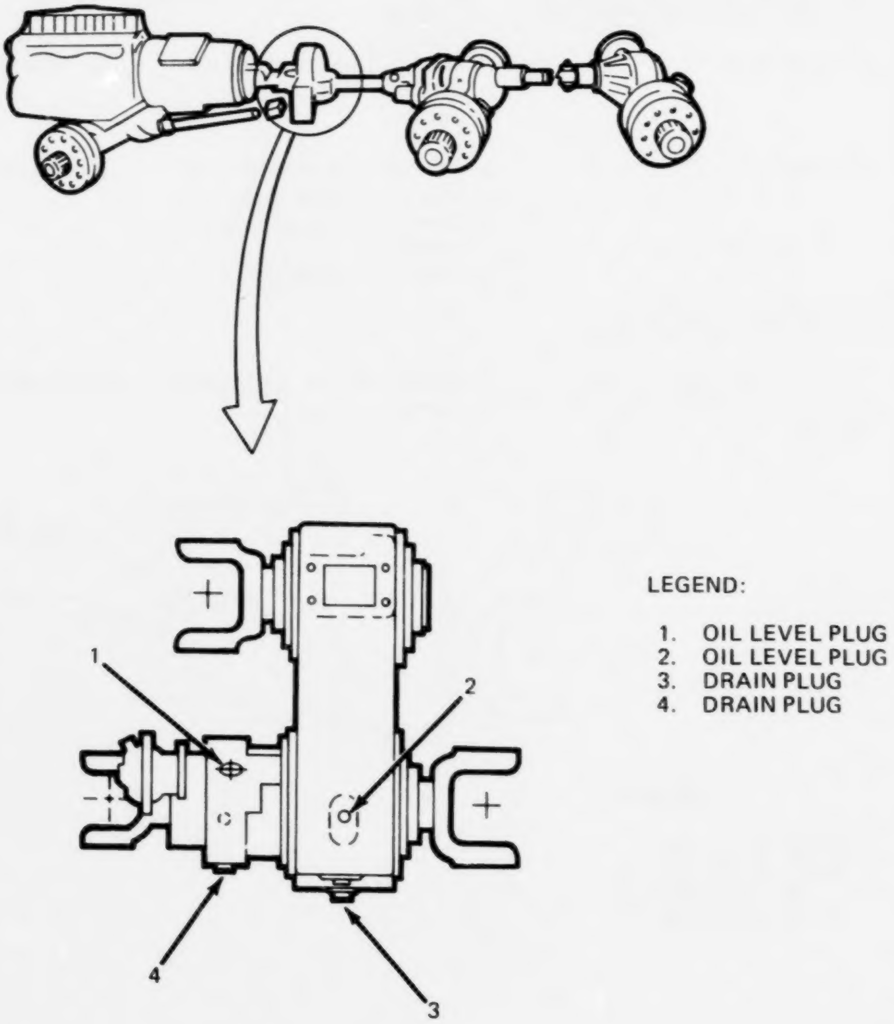
POWER TRANSFER CASE.

7-8. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
1. Oil level plugs (1) and (2).	Unscrew and remove.	

NOTE

Before unscrewing drain plugs, place container underneath to catch oil.



LEGEND:

1. OIL LEVEL PLUG
2. OIL LEVEL PLUG
3. DRAIN PLUG
4. DRAIN PLUG

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POWER TRANSFER CASE.

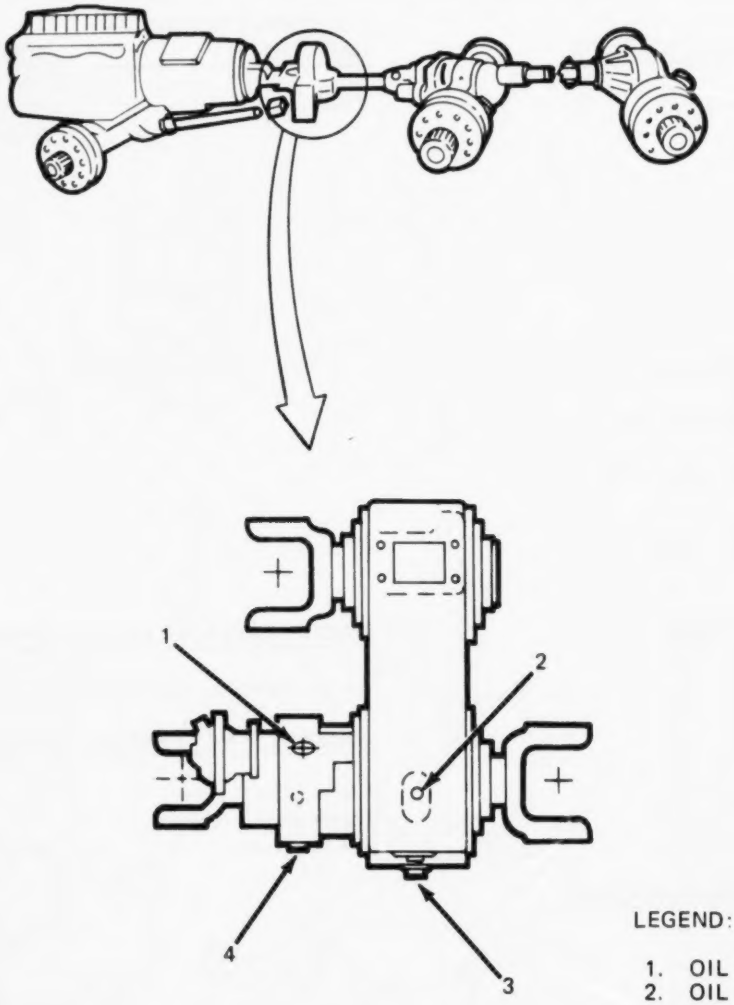
7-8. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL (Continued).		
2. Drain plugs (3) and (4).	a. Unscrew and remove. b. Allow oil to drain out. c. Wipe plugs and openings with clean, dry rag. d. Screw in drain plugs (3) and (4) tightly.	
B. REPLENISHING OIL SUPPLY.		
3. Oil level plug (1).	a. Pour in two quarts of oil. b. Screw in oil level plug (1) tightly.	Use funnel.
4. Oil level plug (2).	a. Add oil until visible in fill hole of transfer case. b. Screw in oil level plug (2) tightly. c. Clean off spilled oil.	Use funnel
C. CHECKING FOR LEAKS.		
5. Two oil level plugs (1) and (2), and two drain plugs (3) and (4).	Road test vehicle, then check for leaks.	Retighten plugs as necessary.

POWER TRANSFER CASE.

7-8. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. OIL LEVEL PLUG
2. OIL LEVEL PLUG
3. DRAIN PLUG
4. DRAIN PLUG

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POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Cleaning and Inspection.	(15)
c. Installation.	(20)
d. Operational Check.	(10)
	65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
7-8A.	Power Transfer Case Oil Drained.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Gaskets - 2, MA128-20004 (34623).
Plugs.
Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen.
Cable Ties - 2, SST4S (06383).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 7-1.

SPECIAL ENVIRONMENTAL CONDITIONS

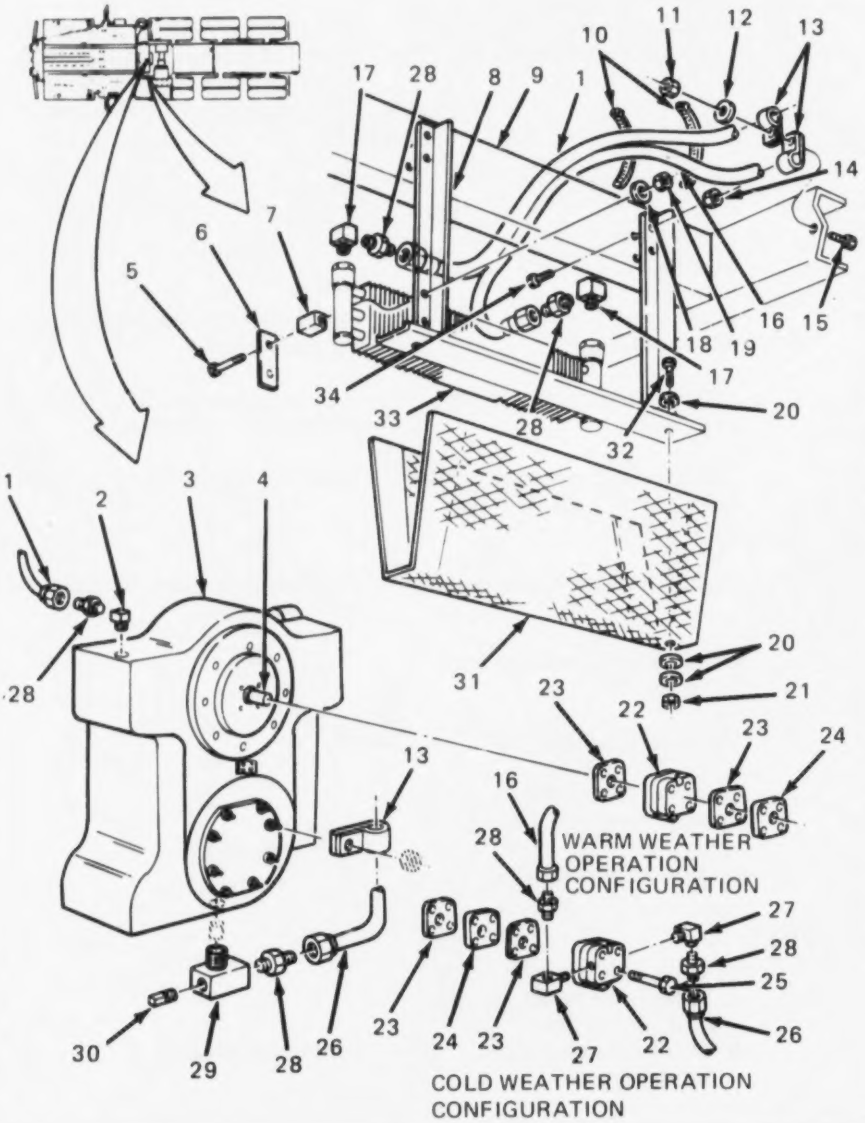
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two bolts (32), six washers (20), and two nuts (21).	Unscrew and remove grille (31).	
2. Lines (1) and (16).	Remove from three adapters (28).	Plug openings; mark location for reassembly.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WARM WEATHER OPERATION CONFIGURATION
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COLD WEATHER OPERATION CONFIGURATION

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

TA 075694

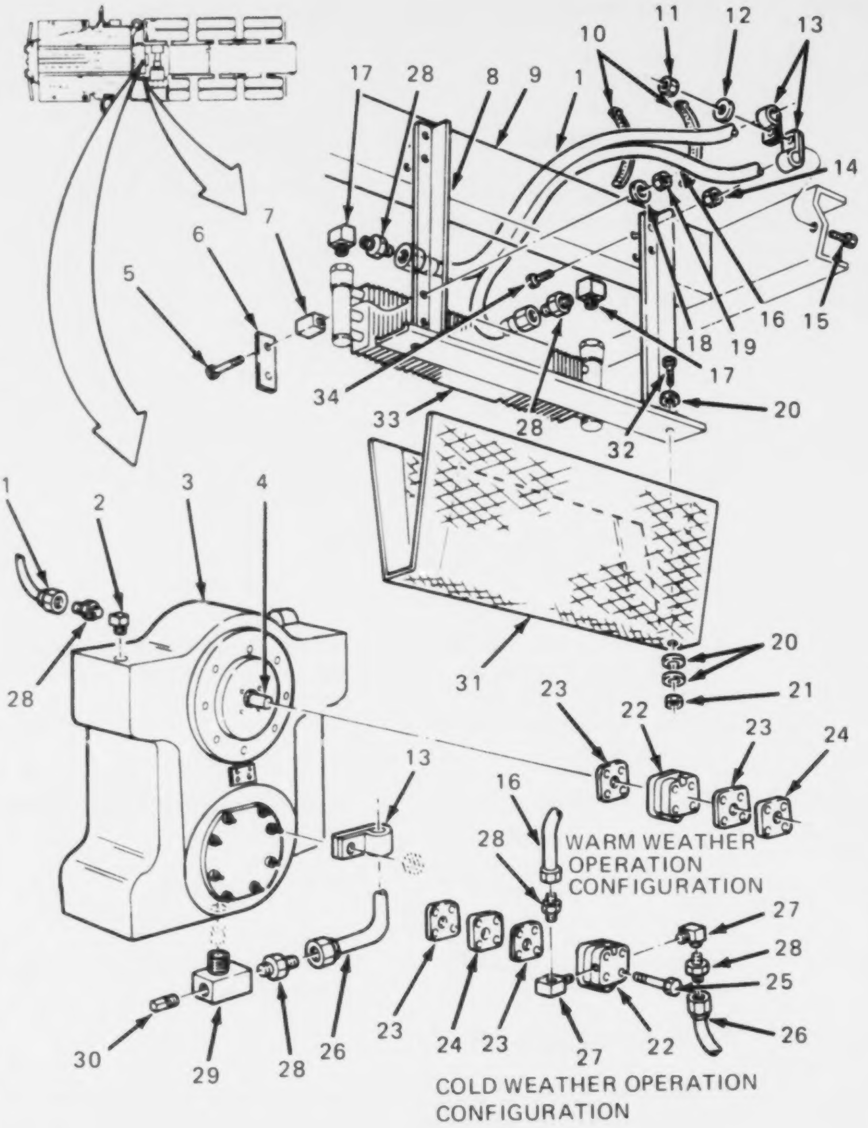
POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two elbows (17) and one elbow (2).	Unscrew from cooler (33) and transfer case (3).	Remove adapters (28) from elbows (17) and (2) if necessary.
4. Four bolts (5), washers (18), and nuts (19).	a. Unscrew and remove two retainers (6), and four mounting plugs (7).	
	b. Lower cooler (33) from two support angles (8).	If support angles (8) are to be removed from winch platform brace (9), remove four bolts (34), washers (18), and nuts (14).
5. Two cable ties (10).	Remove.	Discard.
6. Bolt (15), washer (12), and nut (11).	Unscrew and remove two adapters (28).	
7. Lines (16) and (26).	Disconnect from two adapters (28).	Plug openings; mark location for reassembly.
8. Two elbows (27).	Unscrew and remove from pump (22).	Remove adapters (28) from elbows (27) if necessary.
9. Four bolts (25).	Unscrew and remove pump (22), spacer (24), and two gaskets (23).	Discard gaskets (23).
10. Line (26).	Disconnect from adapter (28).	Plug opening, mark location for reassembly.
11. Clamp (13).	Unscrew existing nuts and remove.	
12. Adapter (28).	Unscrew from tee (29).	
13. Tee (29).	Unscrew from bottom of transfer case (3).	
14. Plug (30).	Unscrew from tee (29).	
B. CLEANING AND INSPECTION.		
15. Cooler (33).	a. Spray with water to clean off debris.	
	b. Check fins and tubes for damage.	Replace as necessary.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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WARM WEATHER OPERATION CONFIGURATION
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COLD WEATHER OPERATION CONFIGURATION

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

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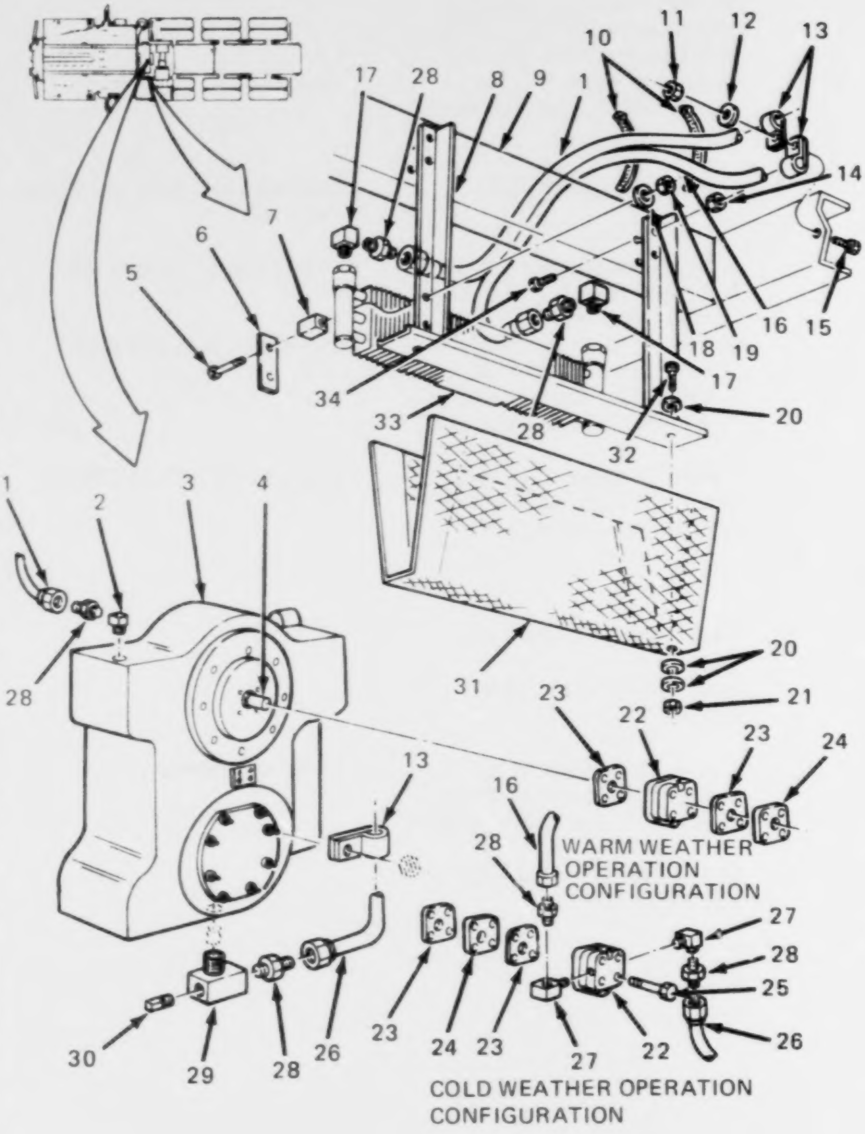
7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND INSPECTION (Continued).		
16. Lines (1), (16), and (26).	a. Wipe clean. b. Inspect for cracks.	Replace as necessary.
17. Fasteners and fittings; all.	Inspect for damaged threads.	Replace as necessary.
C. INSTALLATION.		
	NOTE Remove plugs and apply liquid teflon to all oil carrying connection threads as reassembled.	
18. Plug (30).	Screw into tee (29).	
19. Adapter (28).	Screw into tee (29).	
20. Tee (29).	Screw into bottom of transfer case (3).	
21. Line (26).	Screw onto adapter (28).	Install as marked.
22. Clamp (13).	Install around line (26) and fasten to transfer case with existing nut.	
23. Two new gaskets (23), spacer (24) and pump (22).	a. Aline with shaft (4) and four mounting holes. b. Install with four bolts (25); torque to 14 lb-ft (19 N·m).	Assemble per illustration for either warm or cold weather operation.
24. Two elbows (27)	Screw into pump (22).	Install adapters (28) to elbows if removed.
25. Lines (16) and (26).	Screw onto two adapters (28).	Install as marked.
26. Elbow (2).	Screw into top of transfer case (3).	Install adapter (28) to elbow, if removed.
27. Line (1).	Screw onto adapter (28).	
28. Two support angles (8).	If removed, fasten to winch platform brace (9) with four bolts (34), washers (18), and nuts (14).	Torque to 14 lb-ft (19 N·m).

POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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WARM WEATHER OPERATION CONFIGURATION
27
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COLD WEATHER OPERATION CONFIGURATION

LEGEND:

1.	LINE
2.	ELBOW
3.	TRANSFER CASE
4.	SHAFT
5.	BOLT (4)
6.	RETAINER (2)
7.	MOUNTING PLUG (4)
8.	SUPPORT ANGLE (2)
9.	WINCH PLATFORM BRACE
10.	CABLE TIE (2)
11.	NUT
12.	WASHER
13.	CLAMP (3)
14.	NUT (4)
15.	BOLT
16.	LINE
17.	ELBOW (2)
18.	WASHER (8)
19.	NUT (4)
20.	WASHER (6)
21.	NUT (2)
22.	PUMP
23.	GASKET (2)
24.	SPACER
25.	BOLT (4)
26.	LINE
27.	ELBOW (2)
28.	ADAPTER (6)
29.	TEE
30.	PLUG
31.	GRILLE
32.	BOLT (2)
33.	COOLER
34.	BOLT (4)

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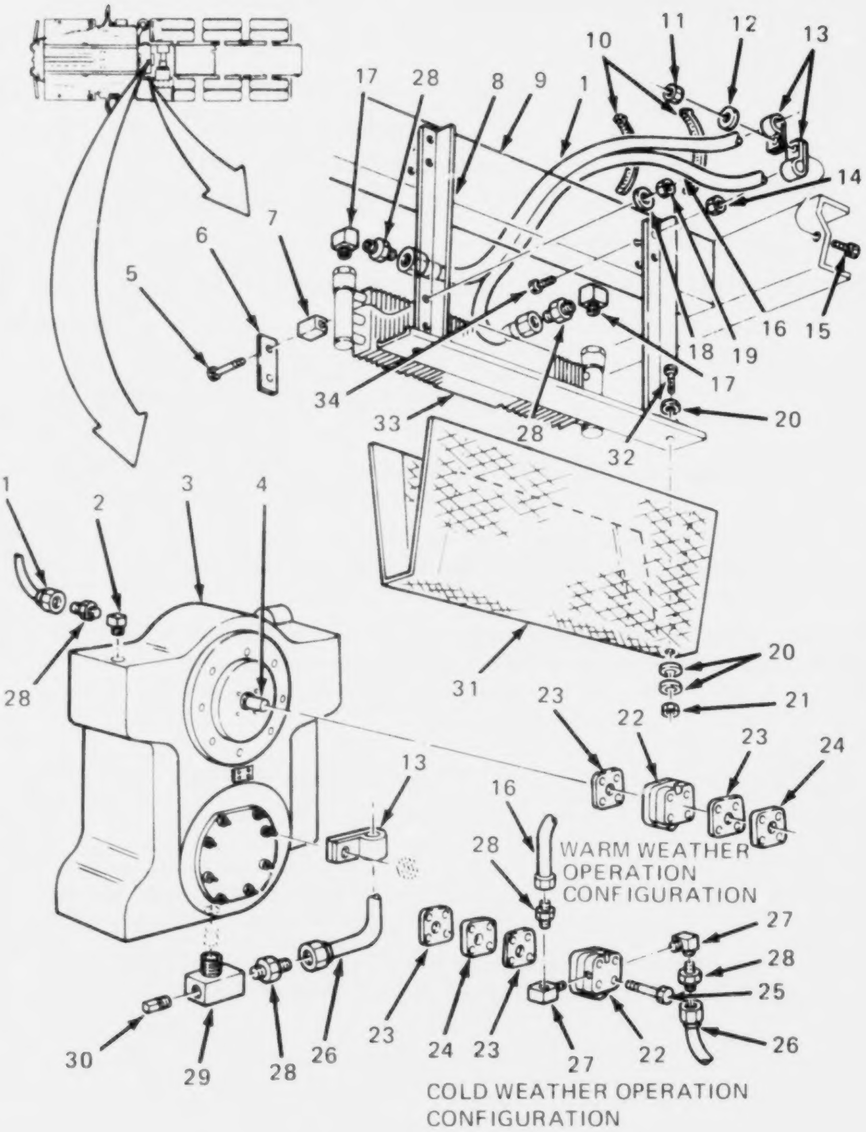
POWER TRANSFER CASE.

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
29. Cooler (33).	Aline with mounting holes on two support angles (8) and secure with four bolts (5), two retainers (6), four mounting plugs (7), four washers (18), and four nuts (19).	Torque to 14 lb-ft (19 N·m).
30. Two elbows (17).	Screw into cooler (33).	Install adapters (28) to elbows if removed.
31. Lines (1) and (16).	a. Screw onto adapters (28). b. Fasten together with two new cable ties (10).	Route along LH frame rail.
	c. Fasten to winch platform with two clamps (13), one bolt (13), one bolt (15), washer (12), and nut (11).	Torque to 9 lb-ft (12 N·m).
32. Grille (31).	Fasten to cooler (33) with two bolts (32), six washers (20) and two nuts (21).	Torque to 14 lb-ft (19 N·m).
D. OPERATIONAL CHECK.		
33. Transfer case (3).	Refill with oil; para 7-8B.	
34. Engine.	Start up (refer to TM 9-2320-273-10).	
35. Cooler system.	Check for leakage at all connection points to transfer case (3) and cooler (33).	Tighten as necessary.
36. Engine.	Shut down (refer to TM 9-2320-273-10).	

7-9. COOLER SYSTEM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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16
28
WARM WEATHER
OPERATION
CONFIGURATION
27
28
25
26
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29
28
26
23
24
23
27
22
COLD WEATHER OPERATION
CONFIGURATION

LEGEND:

1. LINE
2. ELBOW
3. TRANSFER CASE
4. SHAFT
5. BOLT (4)
6. RETAINER (2)
7. MOUNTING PLUG (4)
8. SUPPORT ANGLE (2)
9. WINCH PLATFORM BRACE
10. CABLE TIE (2)
11. NUT
12. WASHER
13. CLAMP (3)
14. NUT (4)
15. BOLT
16. LINE
17. ELBOW (2)
18. WASHER (8)
19. NUT (4)
20. WASHER (6)
21. NUT (2)
22. PUMP
23. GASKET (2)
24. SPACER
25. BOLT (4)
26. LINE
27. ELBOW (2)
28. ADAPTER (6)
29. TEE
30. PLUG
31. GRILLE
32. BOLT (2)
33. COOLER
34. BOLT (4)

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CHAPTER 8

PROPELLER SHAFTS AND AXLE MAINTENANCE

8-1. OVERVIEW.

This chapter provides you with the following information related to propeller shaft and axle maintenance:

a. All required special tools and equipment.
b. Other technical manuals.
c. Troubleshooting procedures.
d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

8-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

8-3. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the propeller shaft and axle procedures described in this chapter are as follows. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

Oil filter strap wrench.

8-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

8-5. INTRODUCTION.

Tables 8-1 and 8-2 contain instructions for troubleshooting the propeller shafts and axles. The corrective actions describe how to fix the problem or refer to a procedure for fixing the problem. The tables are arranged by malfunctions in the following order:

PROPELLER SHAFTS (table 8-1). Excessive shaft noise or vibration.

AXLES (table 8-2).

a. Excessive backlash.
b. Continuous axle or wheel noise.
c. Lubricant leaking.
d. Excessive or uneven tire wear.

If you cannot locate a problem using these procedures, refer to the troubleshooting procedures for wheels, steering, and suspension (para 10-5).

Table 8-1. Propeller Shafts Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. EXCESSIVE SHAFT NOISE OR VIBRATION:

Step 1. Check torque of yoke bolts at universal joints.

Torque bolts to 300 lb-ft (407 N·m).

Step 2. Check torque of capscrews.

Torque capscrews to 100 lb-ft (136 N·m).

Step 3. Inspect propeller shafts and universal joints for evidence of damage or excessive wear.

Replace worn or damaged components (para 8-11).

Step 4. Check universal joints for adequate lubrication.

Lubricate (para 8-11).

Step 5. Check for proper shaft alinement, propeller shafts are properly phased when the cross and bearing in the yokes at each end of shaft are in the same place.

Disassemble and aline as necessary (para 8-11).

NOTE

Look for arrow marks on the propeller shaft and slip yoke. The arrows will point toward each other. If marks are not discernable, punch mark each member insuring reassembly in the same relative position.

Step 6. Remove propeller shaft from vehicle. Check freedom of motion of splines by moving shaft from fully retracted to fully extended. If excessive force is required to retract or extend shaft, or it does not reach full travel, separate shaft halves and inspect splines for wear, damage, and lubrication.

Replace shaft assembly if required (para 8-11).

Table 8-2. Axles Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. EXCESSIVE BACKLASH:

Step 1. Check all universal joints.

Lubricate and replace as necessary (para 8-11).

Step 2. Check drive axle capscrews on universal joints for tightness.

Torque to 100-110 lb-ft (136-149 N·m) (para 8-11D). If the problem persists, notify Direct Maintenance Personnel.

2. CONTINUOUS AXLE OR WHEEL NOISE:

Step 1. Check lube level in axle housing.

Fill axle housing to proper level (para 8-12 for front axle or 8-13 for rear axle).

Step 2. Check lube pump cover (forward rear axle) for visible damage. Remove and check for clogged filter (M915 only).

a. Replace filter as required (para 8-13).

b. Refer problem to Direct Support Maintenance if internal pump damage is evident.

Step 3. Check that brake shoes are not dragging. Check for overheating of brake drum. Jack wheel clear of ground. Use tanker bar to pry up under wheel to check for loose bearings. Any movement of wheels indicates loose bearings. With brakes released spin wheels to check for overly tight bearings. Wheel should spin freely and smoothly. Remove hub and drum to check condition of bearings.

Adjust dragging brakes and clean, repack, or replace bearings as necessary (para 10-13 or 10-14, for front wheels, para 10-15 for rear wheels).

Step 4. Visually inspect tires.

Inflate tires to proper pressure or replace if necessary (refer to TM 9-2320-273-10).

Step 5. Check wheel balance.

Balance wheels, if necessary.

3. LUBRICANT LEAKING:

Step 1. Check all cover plate bolts for tightness.

Table 8-2. Axles Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

LUBRICANT LEAKING (Continued):

Tighten bolts or notify direct support personnel to reseal.

Step 2. Check breathers (driving axles) for obstruction or damage.

Clean or replace as necessary.

4. EXCESSIVE OR UNEVEN TIRE WEAR:

Step 1. Check wheel alinement (para 10-10 for front wheels).

Adjust alinement.

Step 2. Check brake adjustment.

Adjust brake if required (para 9-31 (M915), 9-32 (M916-M920) for front wheels or 9-33 (M915), 9-34 (M916-M920) for rear wheels).

Step 3. Check cold tire pressure.

Inflate to proper pressure (Refer to TM 9-2320-273-10).

Section III MAINTENANCE PROCEDURES

8-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the propeller shafts and axles. To find a specific maintenance procedure, see one of the following task summaries.

a. Propeller Shafts (para 8-7).

b. Front Axle (para 8-8).

c. Rear Axle (para 8-9).

d. Pusher Axle (para 8-10).

8-7. PROPELLER SHAFTS MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Blocks.
Nonflammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 8-1, 8-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Propeller Shafts:	8-11	8-1, 8-2
	A. Removal.	8-11A	
	B. Cleaning and Lubrication.	8-11B	
	C. Inspection of Universals.	8-11C	
	D. Installation.	8-11D	
	E. Checking for Vibration.	8-11E	

8-8. FRONT AXLE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

EQUIPMENT CONDITION PARAGRAPH

None.

CONDITION DESCRIPTION

Axle Oil Warm (Perform Oil Service immediately after truck has been driven).

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GO (27 Pints, 12.7 Liters) (Refer to Appendix C).
GOS Gear Oil if Sub-Zero Use (Refer to Appendix C).
Chassis Grease (Refer to Appendix C).
Liquid Teflon (Refer to Appendix C).
Container (3 Gallon).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
Grease Gun.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Oil Service (M916 thru M920):	8-12	None
	A. Draining Oil.	8-12A	
	B. Replenishing Oil Supply.	8-12B	
	C. Operational Check.	8-12C	

8-9. REAR AXLE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container, 10 Gals (38 Liters).

Gear Oil, GOS if Sub-Zero Use (Refer to Appendix C).

M915	M916 Thru M920.
76 Pints (36 Liters).	62 Pints (29 Liters).

Oil Filter Element (M915), 3280-V-5040 (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 8-2.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	Axle Oil Warm. (Perform Oil Service Immediately After Truck Has Been Driven.)

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission in Neutral.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
	Oil Service:	8-13	8-2
	A. Draining Oil.	8-13A	
	B. Replacing Oil Filter (M915 Only).	8-13B	
	C. Replenishing Oil.	8-13C	
	D. Checking for Leaks.	8-13D	

8-10. PUSHER AXLE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10. 9-13A.	Pusher Axle Down. Air Reservoirs Bled.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Pusher Axle Air Bags (M917, M919, and M920):	8-14	9-1
	A. Removal.	8-14A	
	B. Installation.	8-14B	
	C. Operational Check.	8-14C	
2.	Pusher Axle Lift Cylinders:	8-15	9-1
	A. Removal.	8-15A	
	B. Installation.	8-15B	
	C. Operational Check.	8-15C	

8-10. PUSHER AXLE MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Pusher Axle Pressure Gage :	8-16	9-1
	A. Removal.	8-16A	
	B. Installation.	8-16B	
	C. Operational Check.	8-16C	
4.	Pusher Axle Pressure Regulator Valve :	8-17	9-1
	A. Removal.	8-17A	
	B. Installation.	8-17B	
	C. Operational Check.	8-17C	
5.	Pusher Axle Up-Down Selector Valve :	8-18	9-1
	A. Removal.	8-18A	
	B. Installation.	8-18B	
	C. Operational Check.	8-18C	

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8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(25)
b. Cleaning and Lubrication.	(10)
c. Inspection of Universals.	(10)
d. Installation.	(25)
e. Checking for Vibration.	(15)
	85 Minutes Total .

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Blocks.
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 8-1, 8-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

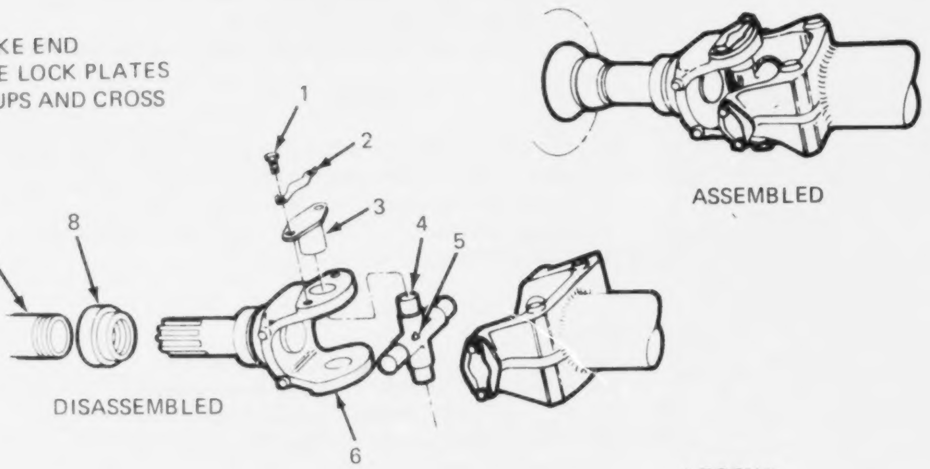
8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

The M915 has two propeller shafts while the M916 thru M920 have four. Two styles of yokes and two universal joints are used throughout the model series as illustrated below.

STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS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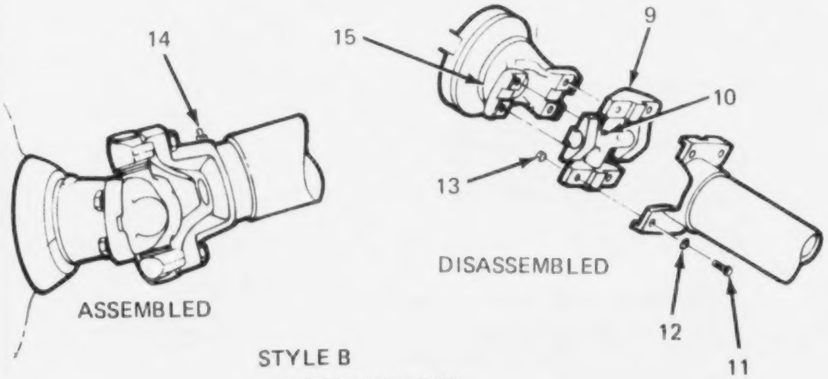
DISASSEMBLED
ASSEMBLED

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE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ASSEMBLED
DISASSEMBLED

STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

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PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM | ACTION | REMARKS

APPLICATION

Model	Quantity	Style	Location
M915	1	A	Prop shaft from transmission to forward rear axle.
	1	B	Prop shaft from forward rear axle to rear rear axle.
M916, M917	1	B	Prop shaft from transmission to top of transfer case.
M918, M919	1	B	Prop shaft from bottom of transfer case to front axle.
M920	1	B	Prop shaft from bottom rear of transfer case to forward rear axle.
	1	A	Prop shaft from forward rear axle to rear rear axle.

NOTE

Before disassembly of any prop shafts and U-joints, punch mark each shaft and joint to insure proper assembly alinement. If already punch marked, do not make new marks, but use existing ones.

NOTE

Before disassembly, use a suitable jack or sling to support shaft. It may be necessary to jack up rear differential with Park Brake OFF to release torque pressure on prop shaft/joint connections.

A. REMOVAL.

STYLE A

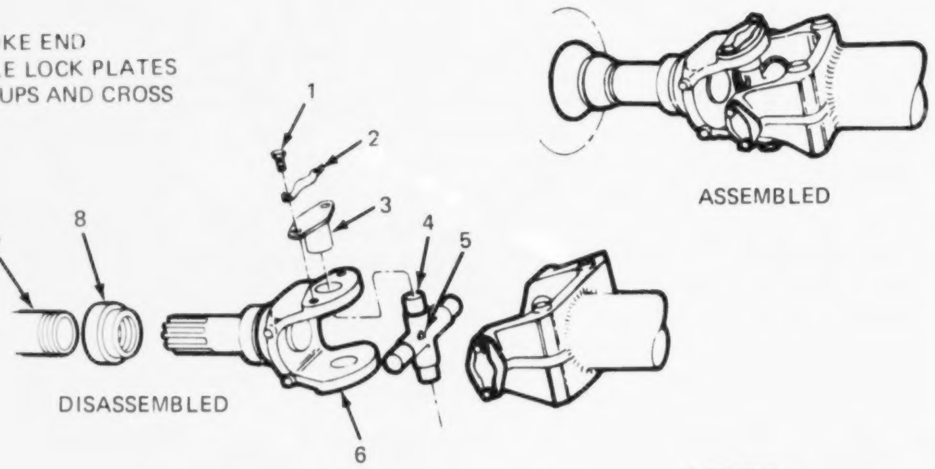
LOCATION/ITEM	ACTION
1. Four lockplates (2).	Bend down tabs as needed.
2. Eight capscrews (1).	Unscrew and remove.
3. Four lockplates (2).	Remove from bearing cups (3).
4. Bearing cups (3).	Remove.
5. Yokes (6) and cross (4).	a. Disengage cross from yokes. b. Remove cross (4). c. Swing shaft yoke free of axle or transmission. d. Unscrew grease fitting (5).

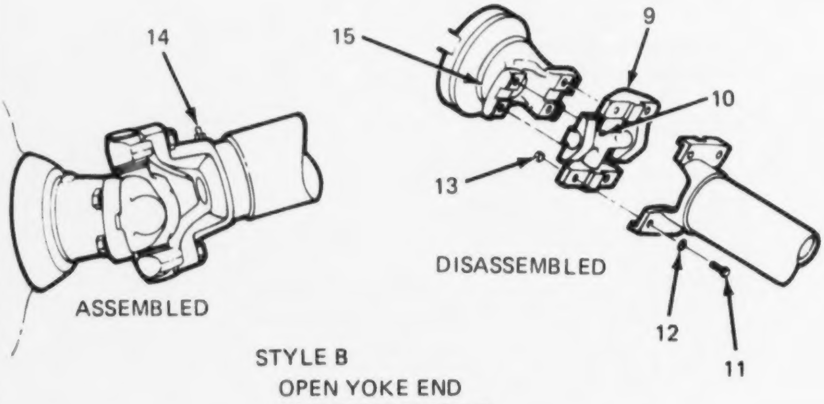
PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
STYLE B		
6. Eight hexhead bolts (11), lockwashers (12), and locknuts (13), if so equipped.	Unscrew and remove.	
7. Universal joint (9).	a. Remove from shaft flange and yoke by inserting suitable tool into slots. Remove support and swing shaft yoke free of axle or transfer case. b. Unscrew grease fitting (10).	

STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS





STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE

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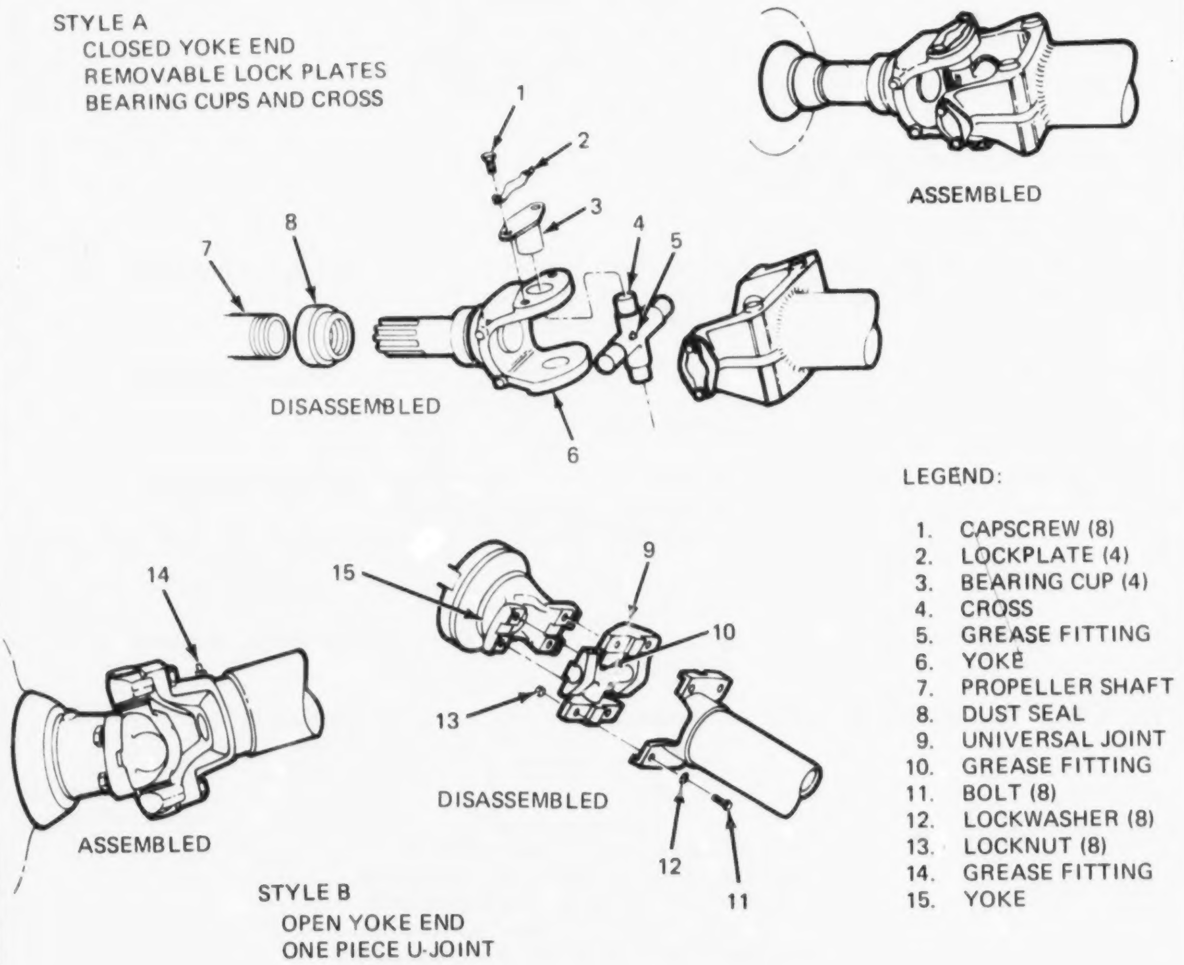
8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
STYLES A AND B		
8. Yoke (6) and propeller shaft (7).	a. Pull yoke (6) out of propeller shaft (7). b. Screw on dust seal (8) and slide yoke (6) and propeller shaft (7) back together.	Inspect dust seal (8) and replace as necessary.
B. CLEANING AND LUBRICATION.	CAUTION Do not allow SD-2 dry cleaning solvent to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.	
STYLE A		
9. Yoke (6), cross (4), four lockplates (2), eight capscrews (1), and grease fitting (5).	a. Soak in dry cleaning solvent to loosen grease and foreign matter. b. Clean thoroughly and refer to 8-11C for inspection prior to lubrication.	
	NOTE Do not disassemble bearing assembly inside bearing cups.	
10. Four bearing cups (3).	a. Clean with a short stiff brush being careful not to dislodge needle bearings. b. Coat lightly with GAA.	
11. Grease fitting (5).	Screw into cross (4) and apply grease liberally thru grease fitting (refer to LO 9-2320-273-12) and on all mating surfaces.	

PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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ASSEMBLED
DISASSEMBLED

STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS

STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE

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PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND LUBRICATION (Continued).		
STYLE B		
12. Universal joint (9), yoke (15), grease fittings (5), (10), and (14).	a. Clean with dry cleaning solvent being careful not to contact seals. Refer to 8-11C for inspection prior to lubrication. b. Screw grease fittings into yokes and joints and apply grease liberally through all grease fittings (5), (10), and (14) (refer LO 9-2320-273-12) and on all mating surfaces.	
C. INSPECTION OF UNIVERSALS.		
STYLE A		
13. Universal joint yokes (6), crosses (4) and bearing cups (3).	Inspect for: a. Excess wear. b. Damaged grease seals.	Replace as necessary.
14. Propeller shaft (7).	Slide shaft sections and inspect for excess spline wear and binding.	Replace as necessary.
15. Grease fitting (5).	Inspect for: a. Damaged threads. b. Damaged tip.	Replace as necessary.
STYLE B		
16. Universal joint (9).	Inspect for damaged grease seals.	Replace as necessary.
17. Grease fittings (10) and (14).	Inspect for damaged threads or tip.	Replace as necessary.

CAUTION

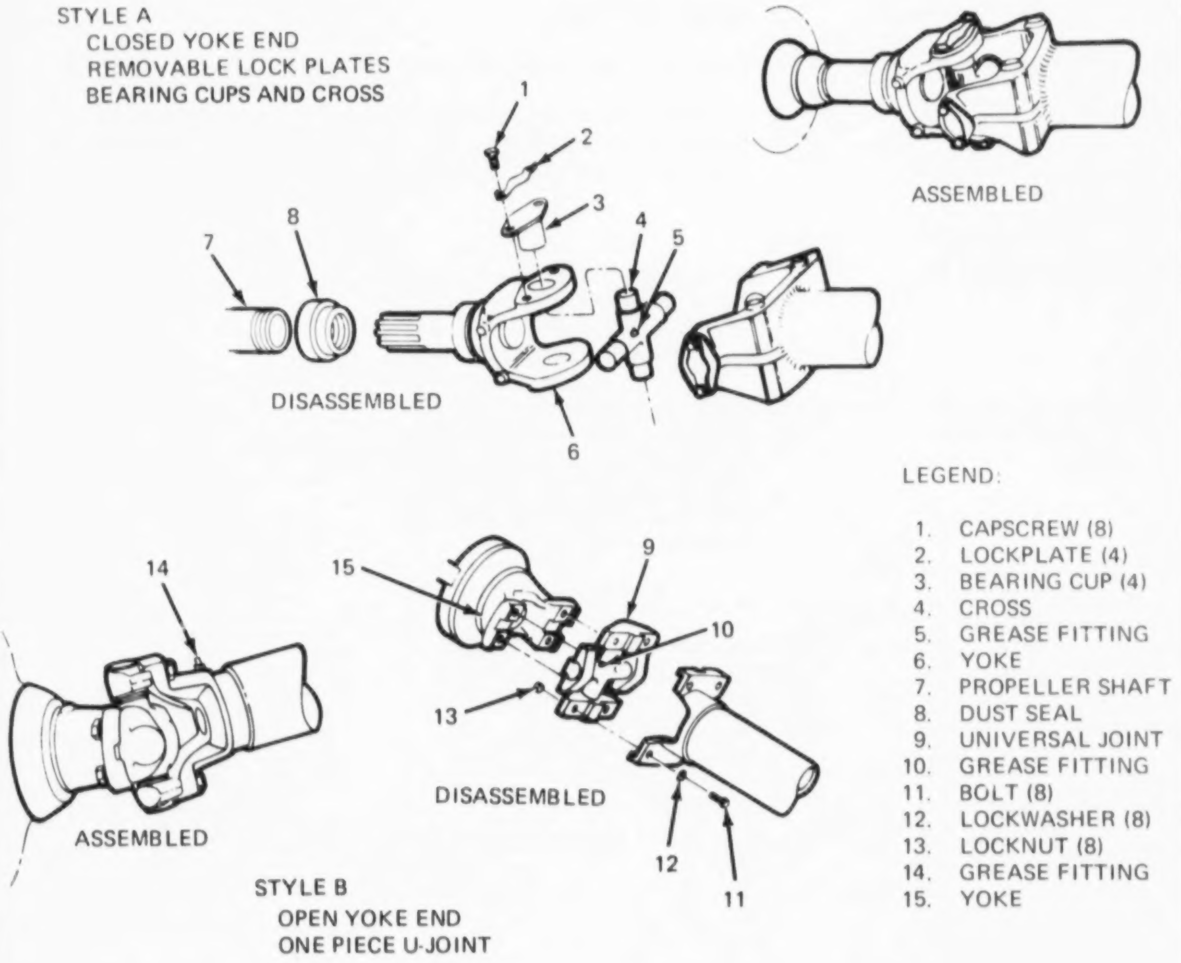
Style A bearing cups (3) and cross (4) should be replaced as a set. Do not use an old cross with new cups or old cups with a new cross. Style B universal joints must be replaced as an assembly if excessive wear or grease leakage is evident. Repair parts are available only in kits.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

For proper alinement of propeller shafts, use the punch marks you made before removal, or the marks that were there from a previous removal.


STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS
1
2
3
4
5
6
7
8
DISASSEMBLED
ASSEMBLED
14
15
9
10
13
12
11
ASSEMBLED
DISASSEMBLED
STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE

TA 074873

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
STYLE A		
18. Yoke (6) and cross (5).	Install cross in one yoke.	
19. Two bearing cups (3).	Press into yoke to secure cross.	
20. Two lockplates (2).	a. Install one on each bearing cup. b. Attach with capscrews (1).	
21. Yoke (6) and cross (4).	Install other yoke.	
22. Two bearing cups (3).	Press into yoke to secure cross.	
23. Two lockplates (2).	a. Install one on each bearing cup. b. Attach with capscrews (1). c. Bend up tabs on lockplates (2).	
STYLE B		
24. Universal joint (9).	Aline mounting holes to propeller shaft flange, install hexhead bolts (11) and lockwashers (12). Tighten to 100-110 lb-ft (136-149 N·m).	
25. Universal joint (9) attached to shaft flange.	Raise into alinement with yoke mounting holes, install hexhead bolts (11) and lockwashers (12). Tighten to 100-110 lb-ft (136-149 N·m). Install locknuts (13), if so equipped.	

NOTE

Follow-on maintenance required: Lubricate all grease fittings (5), (10), and (14) (see LO 9-2320-273-12).

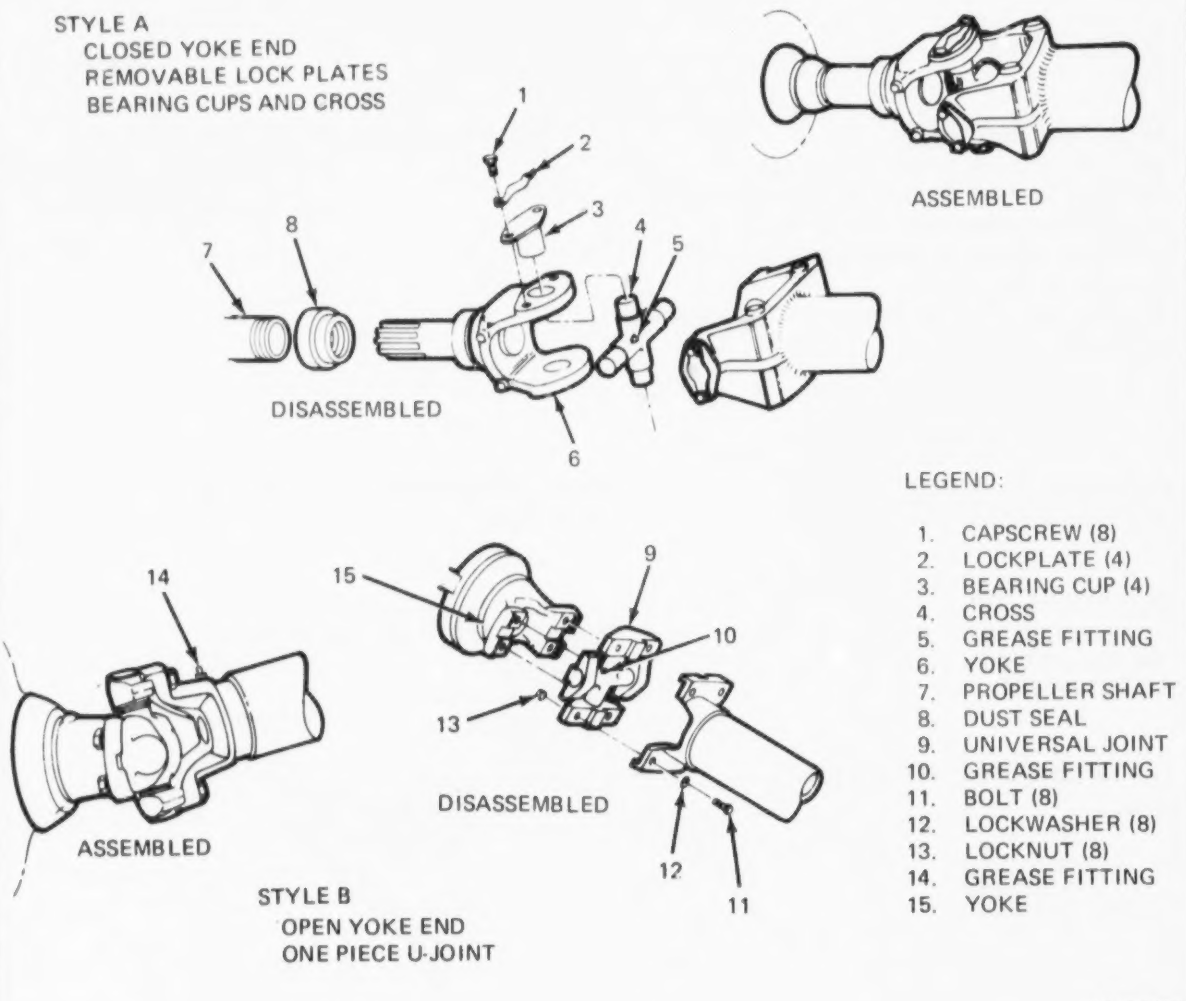
PROPELLER SHAFTS AND UNIVERSAL JOINTS.

8-11. PROPELLER SHAFTS AND UNIVERSAL JOINTS MAINTENANCE (Continued).

E. CHECKING FOR VIBRATION.

STYLE A AND B

LOCATION/ITEM	ACTION	REMARKS
26. Vehicle.	Road test. Check for unusual noise or vibration.	If vibration is present, recheck alinement and bolt tightness. If this doesn't cure, refer to DS/GS maintenanance.


STYLE A
CLOSED YOKE END
REMOVABLE LOCK PLATES
BEARING CUPS AND CROSS
1
2
3
4
5
6
7
8
DISASSEMBLED
ASSEMBLED
14
15
9
10
13
12
11
ASSEMBLED
DISASSEMBLED
STYLE B
OPEN YOKE END
ONE PIECE U-JOINT

LEGEND:

1. CAPSCREW (8)
2. LOCKPLATE (4)
3. BEARING CUP (4)
4. CROSS
5. GREASE FITTING
6. YOKE
7. PROPELLER SHAFT
8. DUST SEAL
9. UNIVERSAL JOINT
10. GREASE FITTING
11. BOLT (8)
12. LOCKWASHER (8)
13. LOCKNUT (8)
14. GREASE FITTING
15. YOKE

TA 074874

8-12. OIL SERVICE (M916 Thru M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Draining Oil.	(15)
b. Replenishing Oil Supply.	(20)
c. Operational Check.	(30)
	65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

CW, 27 Pt (12.7 Liters) (Refer to Appendix C).
GOS Gear Oil if Sub-Zero Use (Refer to Appendix C).
Chassis Grease, GAA (Refer to Appendix C).
Liquid Teflon (Refer to Appendix C).
Container (3 Gal).
Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
Grease Gun.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	Axle Oil Warm (Perform Oil Service Immediately After Truck Has Been Driven.)

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

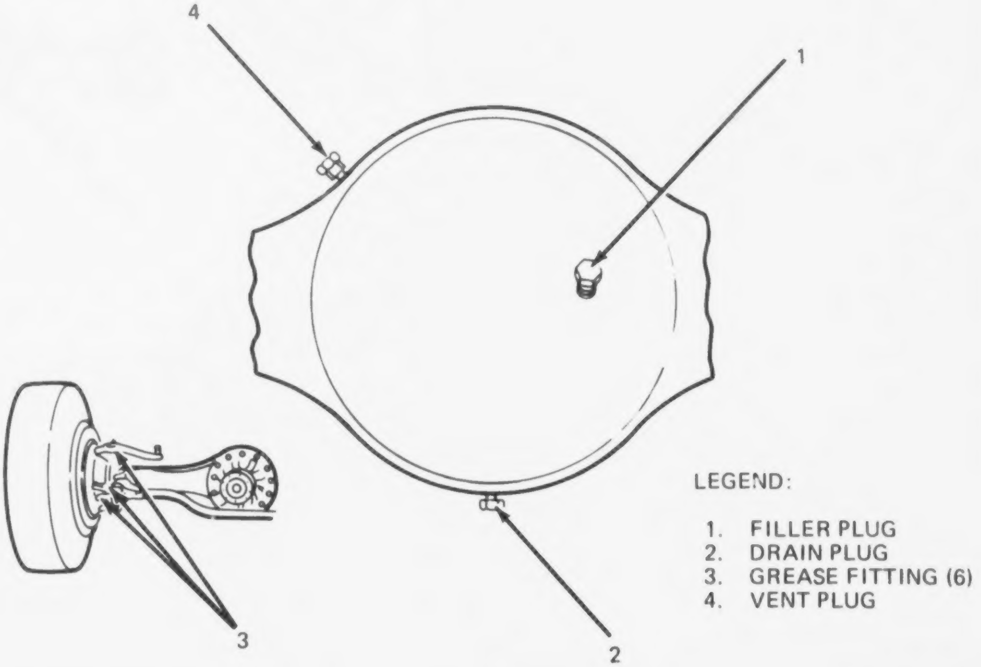
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

FRONT AXLE.

8-12. OIL SERVICE (M916 Thru M920).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
	NOTE Before removing drain plug (2), place container underneath to catch oil.	
1. Filler plug (1) and drain plug (2).	Remove and allow oil to drain out.	
2. Vent plug (4).	a. Remove, inspect, and clean with solvent. b. Install; threads coated with Teflon.	
3. Drain plug (2).	a. Wipe plug and openings clean. b. Screw in and tighten.	



LEGEND:

1. FILLER PLUG
2. DRAIN PLUG
3. GREASE FITTING (6)
4. VENT PLUG

TA 074875

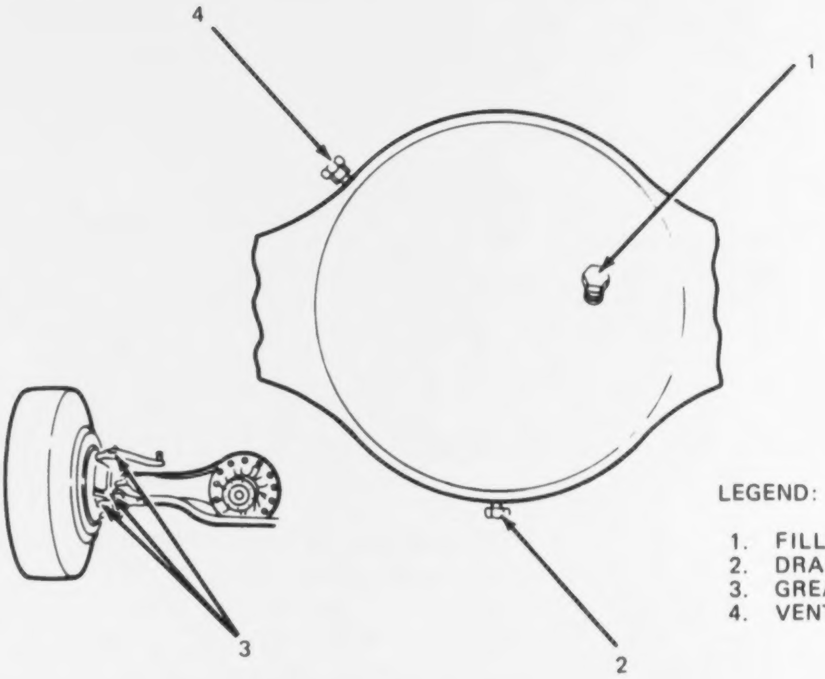
FRONT AXLE.

8-12. OIL SERVICE (M916 Thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. REPLENISHING OIL SUPPLY.		
4. Opening at filler plug (1).	a. Add 27 pts (12.7 liters) of GO. b. Wipe filler plug (1) and opening clean. c. Screw in filler plug (1) and tighten.	If sub-zero useage add GOS gear oil.
5. Six grease fittings (3).	Lubricate with chassis grease, using grease gun.	
C. OPERATIONAL CHECK.		
6. Vehicle.	Road test. Check for unusual noise.	If excessively noisy, refer problem to Direct Support Maintenance.
7. Front driving axle.	After road test, check for leaks.	Retighten plugs as necessary.

FRONT AXLE.

8-12. OIL SERVICE (M916 THRU M920) (Continued).



LEGEND:

1. FILLER PLUG
2. DRAIN PLUG
3. GREASE FITTING (6)
4. VENT PLUG

TA 074876

REAR AXLE.

8-13. OIL SERVICE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Draining Oil.	(15)
b. Replacing Oil Filter (M915).	(5)
c. Replenishing Oil.	(10)
d. Checking for Leaks.	(20)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container. 10 Gals (38 Liters).
Gear Oil , GOS if Sub-Zero Use (Refer to Appendix C).

M915	M916 Thru M920.
76 Pints (36 Liters).	62 Pints (29 Liters).

Oil Filter Element (M915), 3280-V-5040 (78500).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	Axle Oil Warm. (Perform Oil Service Immediately After Truck Has Been Driven.)

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 8-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

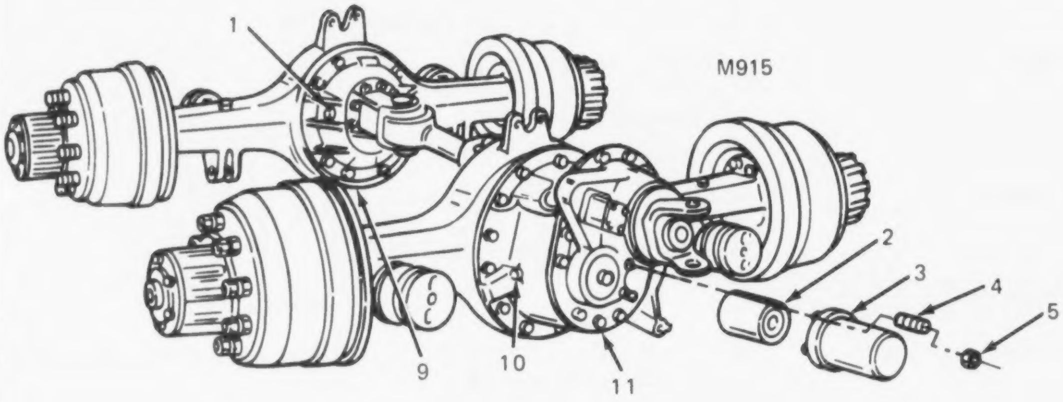
REAR AXLE.

8-13. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL.		
1. Filler plugs (1) and (10) or (7) and (12).	Unscrew and remove.	

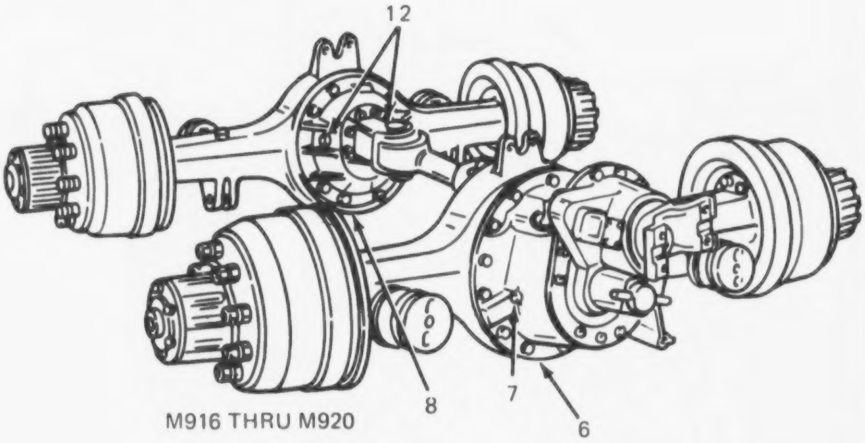
NOTE

Before removing a drain plug, place container underneath to catch oil. Drain plugs are magnetic and any metal particles should be completely removed. If excessive, refer to Direct Support.



LEGEND:

1. FILLER PLUG
2. FILTER
3. FILTER COVER
4. STUD (2)
5. LOCKNUT (2)
6. DRAIN PLUG
7. FILLER PLUG
8. DRAIN PLUG
9. DRAIN PLUG
10. FILLER PLUG
11. DRAIN PLUG
12. FILLER PLUG (2)



M916 THRU M920

TA 074877

REAR AXLE.

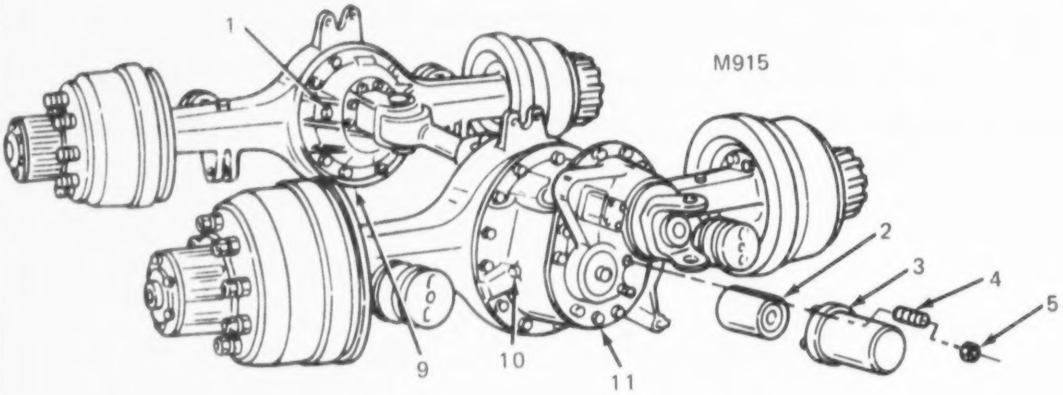
8-13. OIL SERVICE (Continued).

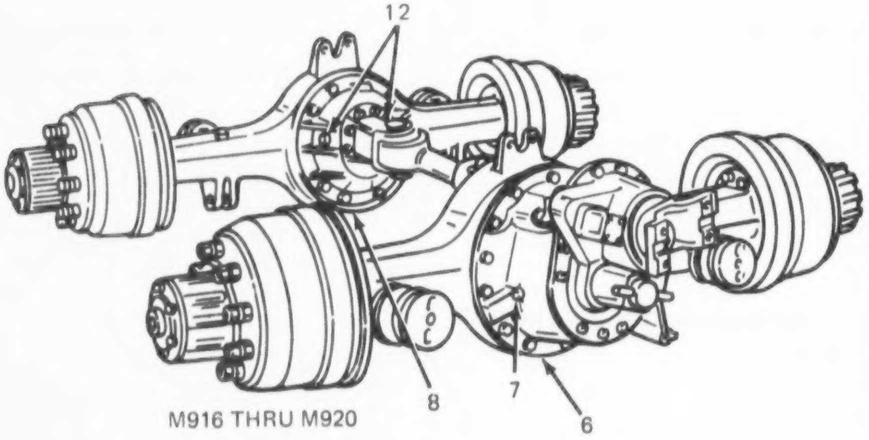
LOCATION/ITEM	ACTION	REMARKS
A. DRAINING OIL (Continued).		
2. Magnetic drain plugs (9) and (11) or (6) and (8).	a. Remove. b. Allow oil to drain. c. Wipe magnetic plugs and axle housing. d. Screw in plugs.	
B. REPLACING OIL FILTER (M915 ONLY).		
3. Two filter cover locknuts (5).	Remove.	Replace studs (4) if damaged.
4. Filter cover (3).	Slide off filter.	
5. Filter (2).	Unscrew and throw away.	You will need to use a strap wrench.
6. New filter (2).	a. Moisten gasket with oil. b. Screw on until gasket contacts adapter. c. Tighten one more full turn.	
7. Filter cover (3).	a. Slide over new filter (2) and studs (4). b. Secure with two locknuts (5).	
C. REPLENISHING OIL.		
8. Front filler plug (10) or (7).	a. Pour in GO. (1) M915 - 40 pts (19 liters). (2) M916 thru M920 - 34 pts (16 liters). b. Screw in filler plug.	Fill with GOS if sub-zero useage.
9. Rear filler plug(s) (1) or (12).	a. Pour in GO. (1) M915 - 36 pts (17 liters). (2) M916 thru M920 - 28 pts (13 liters). b. Screw in filler plug(s).	 One plug. Two plugs.

REAR AXLE.

8-13. OIL SERVICE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. CHECKING FOR LEAKS.		
10. Vehicle.	Road test.	
11. Filler plugs (1) and (10) or (7) and (12); drain plugs (9) and (11) or (6) and (8), filter (2) (M915 only).	a. Check for leaks. b. Check oil level.	 Add more oil if necessary.





LEGEND:

1. FILLER PLUG
2. FILTER
3. FILTER COVER
4. STUD (2)
5. LOCKNUT (2)
6. DRAIN PLUG
7. FILLER PLUG
8. DRAIN PLUG
9. DRAIN PLUG
10. FILLER PLUG
11. DRAIN PLUG
12. FILLER PLUG (2)

TA 074878

8-14. PUSHER AXLE AIR BAGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(20)
c. Operational Check.	(10)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10. 9-13A.	Pusher Axle Down. Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P,

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).

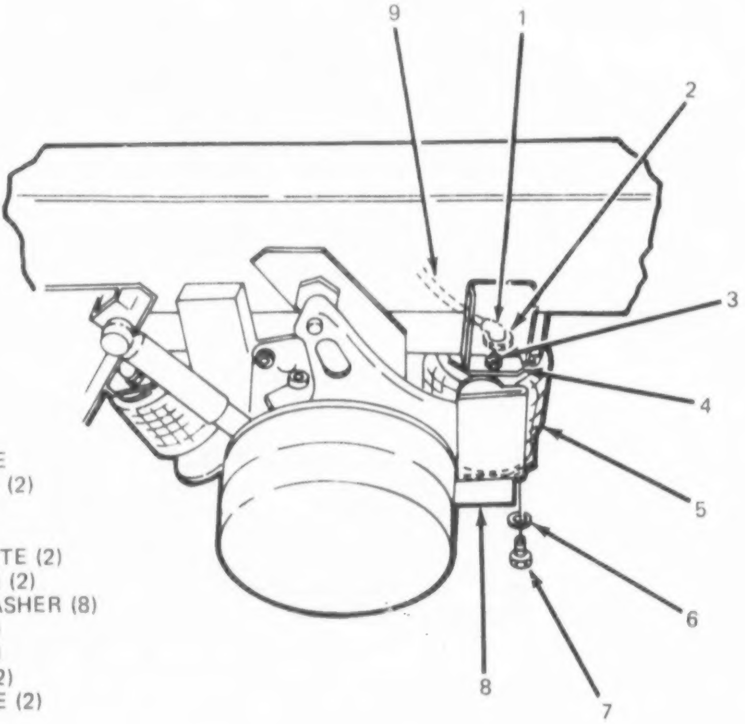
LOCATION/ITEM	ACTION	REMARKS

NOTE

Air bags should be replaced as a pair.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two air lines (9).	a. Unscrew and remove. b. Inspect for: (1) Leaks. (2) Cracks. (3) Damaged fittings.	Replace if necessary. Located on top plate (4) toward inside of chassis rails.
2. Two air line fittings (1).	Unscrew from studs (inner).	Located on top plates (4).
3. Two nuts (2).	Unscrew from studs (inner).	Located on top plates (4).
4. Two nuts (3).	Unscrew from studs (outer).	Located on top plates (4).



LEGEND:

1. AIR LINE FITTING (2)
2. NUT (2)
3. NUT (2)
4. TOP PLATE (2)
5. AIR BAG (2)
6. LOCKWASHER (8)
7. BOLT (8)
8. BOTTOM PLATE (2)
9. AIR LINE (2)

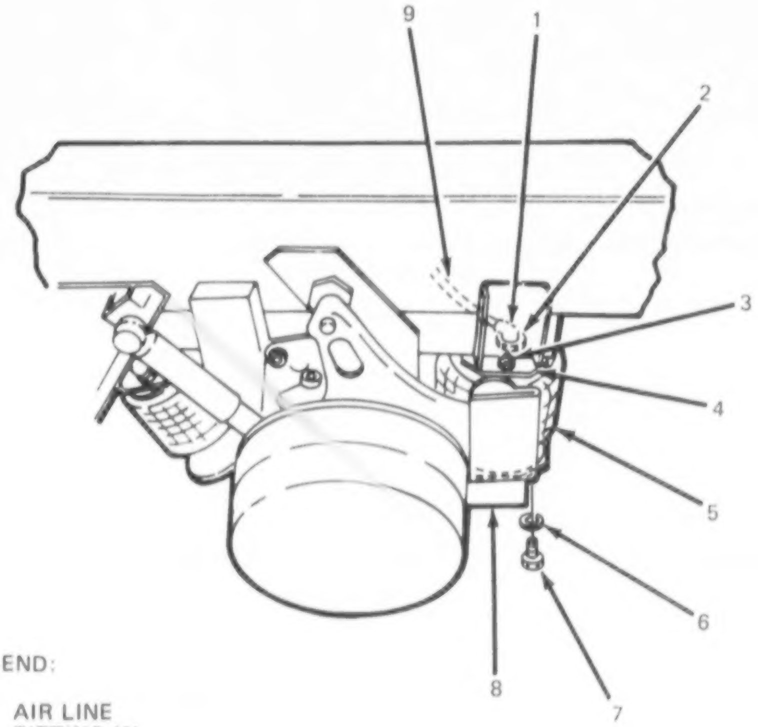
TA 074879

8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Eight bolts (7) and lockwashers (6).	Remove from bottom plates (8).	
6. Two air bags (5).	a. Slide out. b. Inspect for: (1) Deterioration. (2) Cracks.	Replace if cracked or leaking. Replace as a set of two air bags.
B. INSTALLATION.		
7. Two air bags (5).	Slide into position between top plates (4) and bottom plates (8); aline holes.	
8. Eight bolts (7) and lockwashers (6).	Install through bottom plates (8) and tighten.	
9. Two nuts (3).	Install and tighten on outer top plate stud.	
10. Two nuts (2).	Install and tighten on upper inner air line studs.	
11. Two air line fittings (1).	Apply liquid teflon to threads and screw onto upper inner air stud above nuts (2).	
12. Two air lines (9).	Apply liquid teflon and install on air line fittings (1).	
C. OPERATIONAL CHECK.		
13. Engine.	Start up (see TM 9-2320-273-10).	
14. Pusher axle.	Raise and lower (see TM 9-2320-273-10). Check for proper inflation and deflation of both air bags.	
15. Engine.	Shut down (see TM 9-2320-273-10).	

8-14. PUSHER AXLE AIR BAGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. AIR LINE FITTING (2)
2. NUT (2)
3. NUT (2)
4. TOP PLATE (2)
5. AIR BAG (2)
6. LOCKWASHER (8)
7. BOLT (8)
8. BOTTOM PLATE (2)
9. AIR LINE (2)

TA 074880

PUSHER AXLE.

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(20)
c. Operational Check.	(10)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10.	Pusher Axle Down.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

PUSHER AXLE.

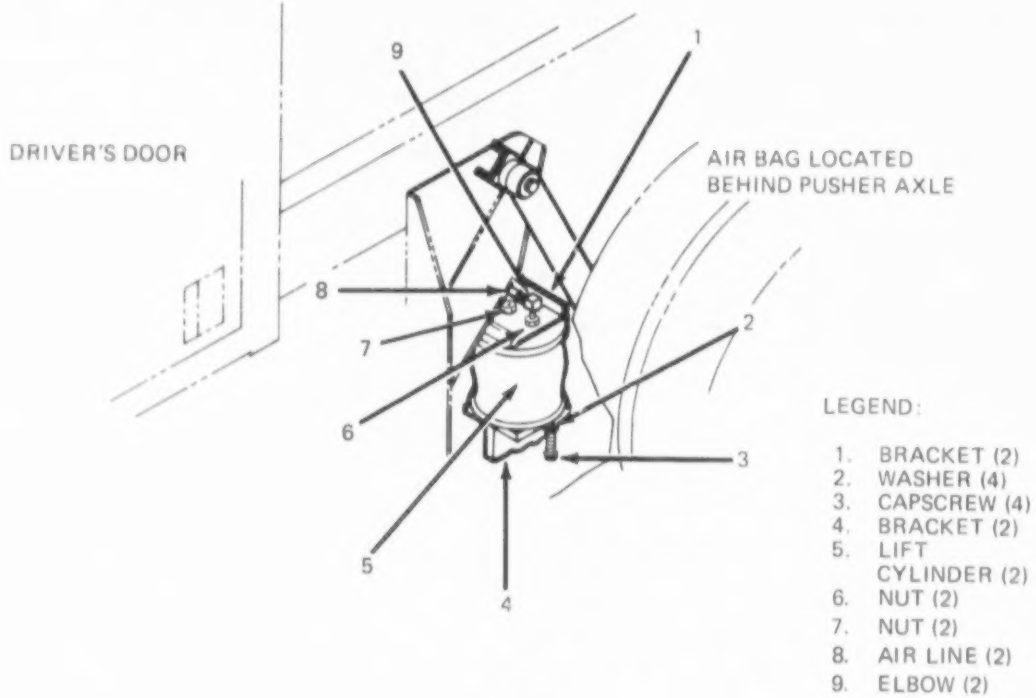
8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

NOTE

Lift cylinders should be replaced as a pair.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two air lines (8) and elbows (9).	a. Unscrew and remove. b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	One on each side of truck. Replace if necessary.
2. Four capscrews (3), and washers (2).	Unscrew and remove.	
3. Two nuts (7).	Unscrew and remove.	
4. Two nuts (6).	Unscrew and remove. Remove two lift cylinders (5).	


9
1
DRIVER'S DOOR
AIR BAG LOCATED BEHIND PUSHER AXLE
8
7
2
6
3
5
4
LEGEND:
1. BRACKET (2)
2. WASHER (4)
3. CAPSCREW (4)
4. BRACKET (2)
5. LIFT CYLINDER (2)
6. NUT (2)
7. NUT (2)
8. AIR LINE (2)
9. ELBOW (2)

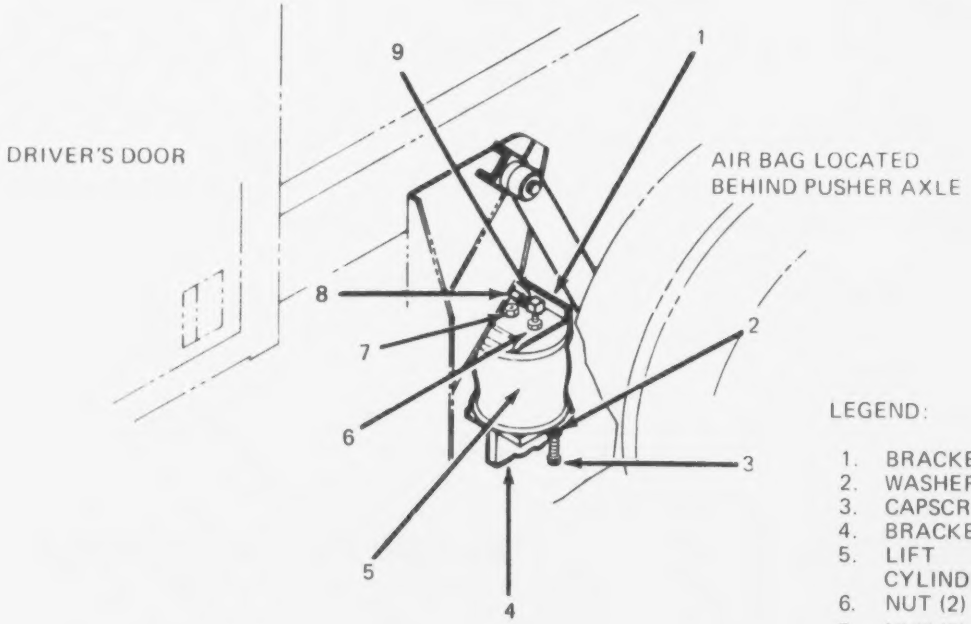
TA 074881

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Two lift cylinders (5).	Place in position. Aline bolt holes. Push studs through brackets (1).	
6. Four capscrews (3) with washers (2).	Screw in and tighten.	
7. Two nuts (7).	Screw on and tighten.	
8. Two nuts (6).	Screw on and tighten.	
9. Two elbows (9) and air lines (8).	a. Put liquid teflon on threads of elbows (9). b. Screw on air lines (8) and tighten.	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10).	
11. Pusher axle.	Raise and lower (see TM 9-2320-273-10). Check for proper inflation and deflation of both lift cylinders.	
12. Engine.	Shut down (see TM 9-2320-273-10).	

8-15. PUSHER AXLE LIFT CYLINDERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


DRIVER'S DOOR
9
1
AIR BAG LOCATED BEHIND PUSHER AXLE
8
7
2
6
3
5
4

LEGEND:

1. BRACKET (2)
2. WASHER (4)
3. CAPSCREW (4)
4. BRACKET (2)
5. LIFT CYLINDER (2)
6. NUT (2)
7. NUT (2)
8. AIR LINE (2)
9. ELBOW (2)

TA 074882

8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
c. Operational Check.	(10)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
TM9-2320-273-10.	Pusher Axle Down.
9-13A.	Air Reservoirs Bled.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

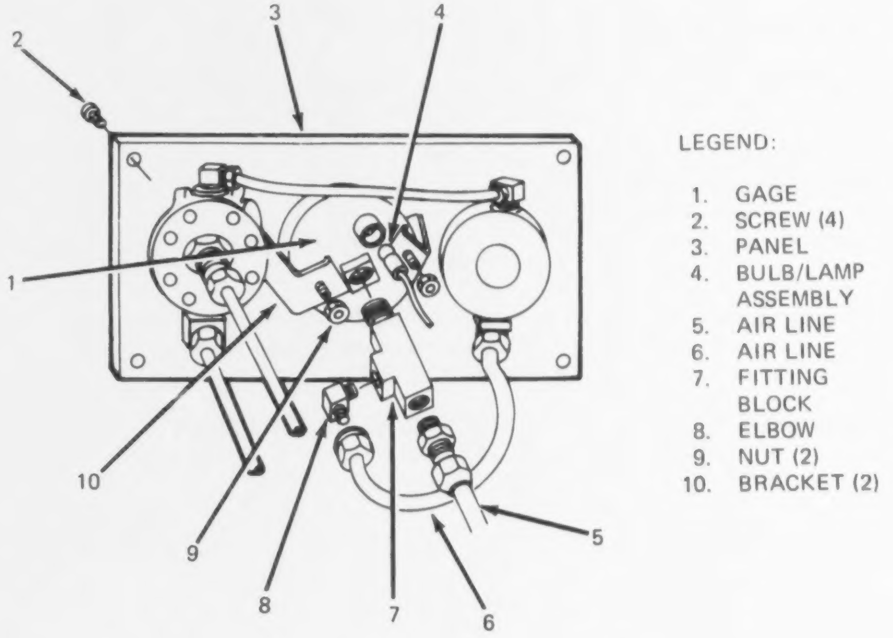
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four screws (2).	Loosen and remove. Remove panel (3).	
2. Bulb/lamp assembly (4).	Disconnect.	
3. Air lines (5) and (6).	a. Unscrew and remove from fitting block (7) and elbow (8).	
	b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
4. Air line fitting block (7).	a. Unscrew from back of gage (1).	Replace if necessary.
	b. Inspect for damaged threads.	


3
4
2
1
10
9
8
7
6
5
LEGEND:
1. GAGE
2. SCREW (4)
3. PANEL
4. BULB/LAMP ASSEMBLY
5. AIR LINE
6. AIR LINE
7. FITTING BLOCK
8. ELBOW
9. NUT (2)
10. BRACKET (2)

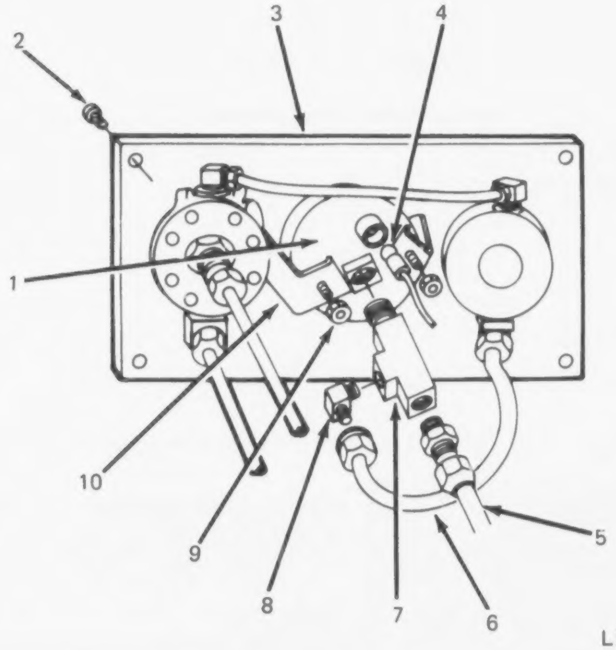
TA 074883

8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two nuts (9).	Unscrew and remove.	
6. Two brackets (10).	Remove.	
7. Gage (1).	Remove.	
B. INSTALLATION.		
8. Gage (1).	Place in panel (3).	
9. Two brackets (10).	Place in position over gage studs.	
10. Two nuts (9).	Screw on and tighten.	
11. Fitting block (7).	Apply liquid teflon to threads and screw into the rear of gage (1).	
12. Air lines (5) and (6).	Screw on and tighten.	
13. Bulb/lamp assembly (4).	Connect.	
14. Panel (3).	Put in place. Screw in and tighten four screws (2).	
C. OPERATIONAL CHECK.		
15. Engine.	Start up (see TM 9-2320-273-10).	
16. Pressure gage.	Check readings as regulator valve is actuated (see TM 9-2320-273-10).	
17. Engine.	Shut down (see TM 9-2320-273-10).	

8-16. PUSHER AXLE PRESSURE GAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. GAGE
2. SCREW (4)
3. PANEL
4. BULB/LAMP ASSEMBLY
5. AIR LINE
6. AIR LINE
7. FITTING BLOCK
8. ELBOW
9. NUT (2)
10. BRACKET (2)

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8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(3.5)
b. Installation.	(3.5)
c. Operational Check.	(2.0)
	9.0 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
TM9-2320-273-10 . 9-13A.	Pusher Axle Down. Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

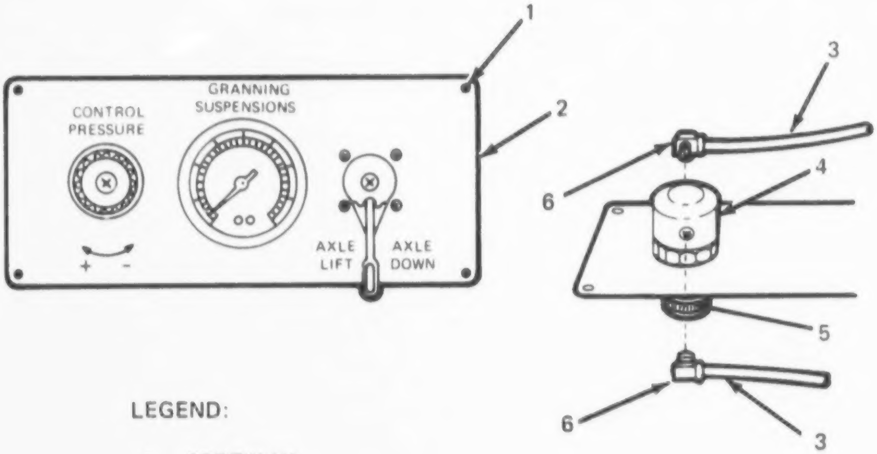
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Four screws (1).	Unscrew and remove. panel (2).	
2. Two air lines (3).	a. Unscrew and remove from elbows (6). b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
3. Elbows (6).	Unscrew from valve (4).	
4. Lockring (5).	Unscrew and remove from panel front. Remove valve (4).	


1
2
3
4
5
6
6
3
CONTROL PRESSURE
GRANNING SUSPENSIONS
+ -
AXLE LIFT
AXLE DOWN

LEGEND:

1. SCREW (4)
2. PANEL
3. AIR LINE (2)
4. VALVE
5. LOCKRING
6. ELBOW (2)

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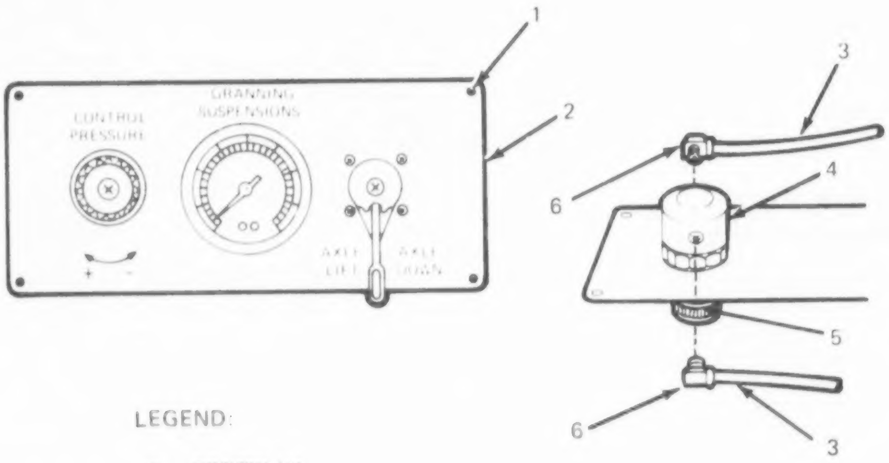
8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Elbows (6).	Apply liquid teflon to threads and screw into valve (4).	
6. Valve (4).	a. Insert in panel (2). b. Screw on and tighten lock-ring (5).	
7. Two air lines (3).	Screw onto fittings (6) and tighten.	
8. Panel (2).	Set in place. Screw in and tighten four screws (1).	
C. OPERATIONAL CHECK.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. Pressure regulator valve.	Check for increases and decreases in pressure readings on gage when valve is operated (see TM 9-2320-273-10).	
11. Engine.	Shut down (see TM 9-2320-273-10).	

PUSHER AXLE.

8-17. PUSHER AXLE REGULATOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
3
2
CONTROL PRESSURE
GRANNING SUSPENSIONS
AXLE LIFT
AXLE DOWN
+
-
6
4
5
6
3

LEGEND:

1. SCREW (4)
2. PANEL
3. AIR LINE (2)
4. VALVE
5. LOCKRING
6. ELBOW (2)

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8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(15)
c. Operational Check.	(10)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10.	Pusher Axle Down.
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

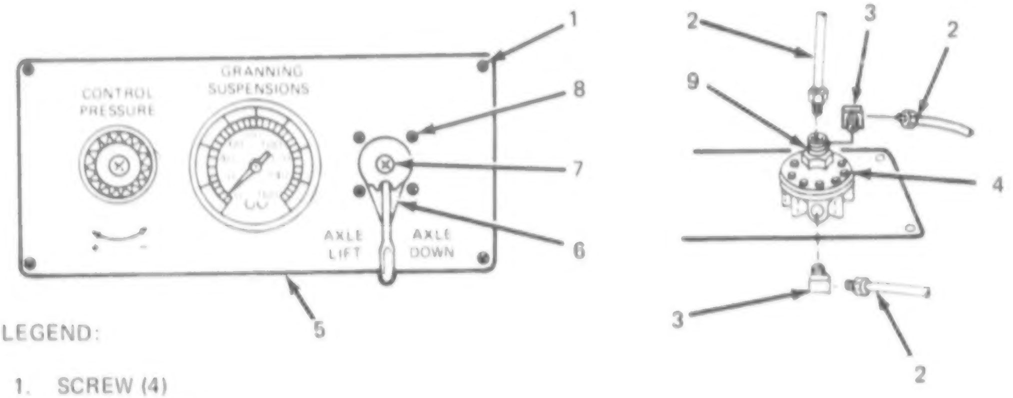
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (7) and lever (6).	Unscrew and remove.	
2. Four screws (1).	Unscrew and remove panel (5).	
3. Three air lines (2).	a. Unscrew and remove from two elbows (3) and straight fitting (9). b. Inspect for: (1) Cracks. (2) Leaks. (3) Damaged fittings.	Replace if necessary.
4. Two elbows (3) and straight fitting (9).	Unscrew from valve (4).	
5. Four screws (8).	Unscrew and remove valve (4).	


1
8
7
6
5
CONTROL PRESSURE
GRANNING SUSPENSIONS
AXLE LIFT
AXLE DOWN
2
3
2
9
4
3
2

LEGEND:

1. SCREW (4)
2. AIR LINE (3)
3. ELBOW (2)
4. VALVE
5. PANEL
6. LEVER
7. SCREW
8. SCREW (4)
9. STRAIGHT FITTING

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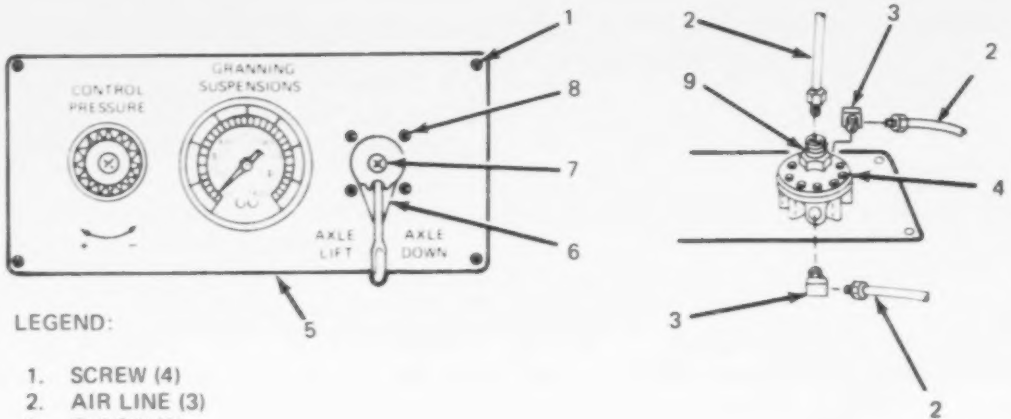
8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
6. Two elbows (3) and straight fitting (9).	Coat threads with liquid teflon and screw into valve (4).	
7. Valve (4).	Attach to panel (5) with four screws (8). Tighten screws.	
8. Three air lines (2).	Screw into two elbows (3) and straight fitting (9).	Supply line goes to center of valve, air bag line goes to top of valve, and lift cylinder line goes to bottom of valve.
9. Panel (5).	Set in place. Screw in and tighten four screws (1).	
10. Lever (6).	Attach to valve (4) and tighten screw (7).	
C. OPERATIONAL CHECK.		
11. Engine.	Start up (see TM 9-2320-273-10).	
12. Pusher axle.	Check for proper raising and lowering (see TM 9-2320-273-10).	
13. Engine.	Shut down (see TM 9-2320-273-10).	

8-18. PUSHER AXLE UP-DOWN SELECTOR VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
2
8
9
7
4
6
5
3
2
CONTROL PRESSURE
GRANNING SUSPENSIONS
AXLE LIFT
AXLE DOWN

LEGEND:

1. SCREW (4)
2. AIR LINE (3)
3. ELBOW (2)
4. VALVE
5. PANEL
6. LEVER
7. SCREW
8. SCREW (4)
9. STRAIGHT FITTING

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CHAPTER 9

COMPRESSED AIR AND BRAKE SYSTEMS

9-1. OVERVIEW.

This chapter provides you with the following information related to compressed air and brake maintenance:

a. All required special tools and equipment.
b. Other technical manuals.
c. Troubleshooting procedures.
d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

9-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

9-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the compressed air and brake maintenance procedures described in this chapter are limited to the following items. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

a. Air Pressure Gage (0-200 psi min).
b. Brake spring pliers.
c. Wheel dolly, jacks, and blocks.
d. Oil filter strap wrench.

9-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools list covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

9-5. INTRODUCTION.

a. General. The primary use of the compressed air system is to operate the service and park/emergency vehicle brakes. Other uses of compressed air are for transmission shifting control, air horn operation, windshield wiper and washer operation, the differential lockout, and on some vehicles, pusher axle controls, and front wheel drive. Air system component location illustrations for each truck model are contained in paragraphs 9-5e thru 9-5j. These same illustrations are contained in paragraphs 2-65 thru 2-70 and the components are further described in paragraph 2-64.

b. Scope. This section contains troubleshooting instructions based on observed malfunctions starting with generalized pressure problems and continuing to more specific malfunctions of components and compressed air functions.

c. Test Equipment: Air pressure gage (0-200 psi min).

d. Troubleshooting. Troubleshooting procedures are given in table 9-1. The procedures are grouped under the malfunctions listed below. Perform only those steps in a procedure required to remedy the malfunction.

1. Insufficient air pressure (Malfunction No. 1).
2. Excessive system pressure indicated (Malfunction No. 2).
3. Park brakes will not release (Malfunction No. 3).
4. Trailer or towed vehicle brakes will not release (Malfunction No. 4).
5. Service brake will not release (one wheel only) (Malfunction No. 5).
6. Service brakes will not apply (Malfunction No. 6).
7. No service brakes on trailer or towed vehicle only (Malfunction No. 7).
8. Trailer hand control will not apply trailer service brakes (Malfunction No. 8).
9. Park brakes will not apply (Malfunction No. 9).
10. Service brakes are weak or slow responding (all wheels) (Malfunction No. 10).
11. Front service brakes are weak or slow responding (Malfunction No. 11).
12. Rear service brakes are uneven or erratic (Malfunction No. 12).
13. Service brakes are uneven or erratic on one or more wheels (Malfunction No. 13).
14. Brakes overheat (Malfunction No. 14).
15. Stop lamps do not operate, brakes function normally (Malfunction No. 15).
16. Pressure gage(s) not indicating or is not accurate, brakes normal (Malfunction No. 16.
17. Air horn does not operate (Malfunction No. 17).
18. Windshield wipers or washers are inoperative (Malfunction No. 18).
19. Interaxle differential lockup inoperative (Malfunction No. 19).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures.

MALFUNCTION.
TEST OR INSPECTION.
CORRECTIVE ACTION.

---

1. INSUFFICIENT AIR PRESSURE:

Step 1. Check for air exhausting through open or damaged air reservoir drain valves.

a. Close or replace manual drain valve (para 9-13).

b. Replace automatic drain valve on supply reservoir (para 9-12).

Step 2. Check for loose air connections between the compressor, governor, and air reservoirs.

Tighten any loose air connections and replace damaged components.

Step 3. Check governor for proper operation and adjustment. Should be set to control pressure in supply reservoir at 105-125 psi (724-862 kPa).

Refer problem to Direct Support Maintenance.

Step 4. With the engine not running, loosen the compressor output line at the compressor and listen for escaping air.

a. If air escapes continously, replace the check valve in that line at the supply reservoir (para 9-15).

b. If the check valve is okay, refer problem to Direct Support Maintenance.

Step 5. Check air line connections for tightness and air lines for cracks or breaks.

Tighten or replace connections and lines as necessary.

2. EXCESSIVE SYSTEM PRESSURE INDICATED:

Step 1. Check for inoperative pressure safety relief valve on the supply reservoir.

Replace the safety release valve (para 9-14) only if reservoir exceeds 150 psi.

Step 2. Check governor for proper operation.

Refer problem to Direct Support Maintenance.

3. PARK BRAKES WILL NOT RELEASE:

Step 1. Check reservoir pressure gage and verify LOW PRESSURE warning lamp is out.

See Malfunction 1.

Step 2. Verify PARK BRAKE manual valve is closed.

Close valve; if valve will not close, refer to para 9-19.

Step 3. Check air lines for leakage or damage. Use a soap solution to check for leakage at connections and watch for bubbles.

Replace damaged lines and tighten loose connections (para 9-36).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

---

3. PARK BRAKES WILL NOT RELEASE (Continued):

Step 4. (M915, M916 and M920 only). Inspect intervehicle air hoses for proper connections.

Connect hoses properly.

Step 5. Check the air line between the two rear quick-release valves for damage or leaks using a soap solution.

a. Replace the line if damaged and tighten connections.

b. Replace the park brake quick-release valve (para 9-22).

4. TRAILER OR TOWED VEHICLE BRAKES WILL NOT RELEASE:

Step 1. Check intervehicle air hoses for proper connections. Close the trailer supply valve and disconnect the hoses.

Reconnect the hoses and open the supply valve.

Step 2. Check for trailer air leaks or defective brakes.

Troubleshoot trailer.

5. SERVICE BRAKES WILL NOT RELEASE (ONE WHEEL ONLY):

Troubleshoot brake.

Refer to brake malfunctions 3 and 4, above.

6. SERVICE BRAKES WILL NOT APPLY:

Step 1. Check the pressure gages in the cab.

Operate the engine to build up proper pressure.

Step 2. Check position of park brake and trailer supply valves.

Position correctly.

Step 3. (M915, M916 and M920 only). Check intervehicle connections.

Connect air hoses correctly and open trailer supply valve.

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

6. SERVICE BRAKES WILL NOT APPLY (Continued):

Step 4. Check for leakage at the brake pedal valve using a soap solution.

Tighten connections or replace defective brake pedal valve (para 9-21).

Step 5. Check brakes for proper adjustment and worn linings.

Adjust brakes (para 9-31, 9-32, 9-33, 9-34).

7. NO SERVICE BRAKES ON TRAILER OR TOWED VEHICLE ONLY:

Step 1. Check service air hose connection and position of trailer supply valve.

Reconnect hose properly and open trailer supply valve.

Step 2. Check trailer supply valve for damage or leakage using a soap solution.

Replace defective valve (para 9-17).

Step 3. Check the double-check valve(s) for damage or leakage using a soap solution.

Replace defective valve (para 9-27).

Step 4. Check tractor protection valve for damage or corrosion.

If valve is defective, replace defective valve.

8. TRAILER HAND CONTROL WILL NOT APPLY TRAILER SERVICE BRAKES:

Step 1. Check air lines between trailer hand control and double check valve for leakage using a soap solution.

Repair leaks.

Step 2. Check tractor protection valve for damage or leaks using a soap solution.

Tighten connections or replace valve (para 9-26).

Step 3. Check the double-check valve for damage or leaks using a soap solution.

Tighten connections or replace valve (para 9-27).

9. PARK BRAKES WILL NOT APPLY:

Step 1. Inspect vent on the park brake valve for damage or clogging.

Clean vent or replace valve (para 9-19).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

9. PARK BRAKES WILL NOT APPLY (Continued):

Step 2. Check air chambers for proper position of caging bolt.

Adjust caging bolt (para 9-37).

10. SERVICE BRAKES ARE WEAK OR SLOW RESPONDING (ALL WHEELS):

Step 1. Check for low reservoir pressure. Pressure should not be below 80 lbs. (Buzzer sounds at 80 lbs).

See Malfunction 1.

Step 2. Check service air lines for damage and leakage using a soap solution.

Tighten loose connections and replace damaged lines.

Step 3. Check brake linings and adjustment (para 9-31, 9-32, 9-33, 9-34, 9-35).

Replace brake linings and/or adjust as necessary.

11. FRONT SERVICE BRAKES ARE WEAK OR SLOW RESPONDING:

Step 1. Check air lines between brake pedal valve and front brake chambers for damage and leakage using a soap solution.

Tighten loose connections and replace damaged lines.

Step 2. Check the limiting valve for damage and leakage using a soap solution.

Replace defective limiting valve (para 9-25).

Step 3. Check the brake pedal valve for damage and leakage using a soap solution.

Replace defective valve (para 9-21).

Step 4. Check front brakes for worn linings (shoes) and proper adjustment.

Adjust brakes and replace linings if necessary (para 9-31, 9-32).

12. REAR SERVICE BRAKES ARE UNEVEN OR ERRATIC:

Step 1. Check for leakage in air lines between service brake relay valve and wheel air chambers using a soap solution.

Tighten loose connections or replace defective components.

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

12. REAR SERVICE BRAKES ARE UNEVEN OR ERRATIC (Continued):

Step 2. Check for air leakage between the air reservoir and the rear service brake relay valve.

Tighten loose connections or replace damaged line.

Step 3. Leak test rear brake part of the brake pedal valve.

Tighten loose connections or replace pedal valve (para 9-21).

Step 4. Check brake shoes for proper adjustment.

Adjust brake shoes (para 9-39).

13. SERVICE BRAKES ARE UNEVEN OR ERRATIC ON ONE OR MORE WHEELS :

Step 1. Have an assistant press and hold the brake pedal valve down and perform leakage test on air lines at affected wheels using a soap solution.

Tighten loose connections, repair or replace damaged air lines or hoses.

Step 2. Loosen line fitting at affected wheel air chamber and have an assistant lightly depress the treadle valve. Listen for air exhausting from line. No air indicates a clogged line.

Replace damaged or clogged line.

Step 3. Check brake adjustment (para 9-31, 9-32, 9-39):

a. Adjust brake and schedule for maintenance as soon as possible.
b. If manual adjustment does not correct the problem, refer problem to Direct Support Maintenance.

Step 4. Press brake pedal down and listen for air leakage around wheel air chamber clamp.

Tighten clamp or replace ruptured chamber diaphragm (para 9-36 for front brakes, para 9-37 for rear brakes).

Step 5. Remove hub and drum assembly to inspect plunger and adjuster mechanism and brake return springs (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes).

Clean, repair or replace defective components.

Step 6. Check the brake linings for grease, glazing and proper installation (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes).

Clean, replace, or reinstall as required.

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

---

14. BRAKES OVERHEAT :

Step 1. Check for low reservoir pressure.

If below 80 psi, see Malfunction 1.

Step 2. Check for damaged or leaking front limiting valve or rear relay valves.

Tighten loose connections or replace defective valve (para 9-24 or 9-25, as applicable).

Step 3. Pull hub and drum assembly (para 10-13 through 10-15 as applicable) and inspect brake assembly. Apply brakes lightly and observe shoe movement for smooth operation.

a. Replace weak or broken return springs (para 9-31 and 9-32 for front brakes, 9-33 and 9-34 for rear brakes).

b. Clean, service, and assemble brake mechanism.

Step 4. Check for insufficient lining to drum clearance (para 9-31 and 9-32 for front brakes, para 9-33 and 9-34 for rear brakes).

a. Adjust.

b. If adjusting fails, refer problem to Direct Support Maintenance.

Step 5. Inspect wheel bearings for damage and proper lubrication.

Adjust, lube, or replace bearings (para 10-13 through para 10-15 as applicable).

15. STOP LAMPS DO NOT OPERATE, BRAKES FUNCTION NORMALLY:

Step 1. Have an assistant step on the brake pedal (with ignition key switch on) and check for approximately 12 volts dc at both electrical connections on the stoplamp switch.

If voltage is not present on both terminals, replace the double-check valve/stop lamp switch (para 9-28 or 9-29).

Step 2. Check for defective wiring or electrical connectors.

Troubleshoot the electrical system (para 5-17).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

16. PRESSURE GAGE(S) NOT INDICATING OR IS NOT ACCURATE, BRAKES NORMAL :

Step 1. Disconnect affected air line(s) at gage(s) and press the brake pedal. If no air exhausts, the line is clogged or broken.

Replace defective line or gage (para 9-20).

17. AIR HORN DOES NOT OPERATE :

Step 1. Check for air LOW PRESSURE.

If air pressure is below 20 lbs , operate engine until air pressure is back to 120 lbs. See Malfunction 1.

Step 2. Inspect air lines for damage or clogging.

a. Replace damaged or clogged lines.
b. Replace defective manually-operated horn valve (para 9-45).

18. WINDSHIELD WIPERS OR WASHERS ARE INOPERATIVE:

Step 1. Check for air leakage in lines to the wiper or washer control valve using a soap solution.

Tighten loose connections and replace damaged lines.

Step 2. Check to see if the wiper mechanical linkage is binding or broken.

Replace defective linkage (para 9-42).

Step 3. Loosen air line at the wiper motor and turn control to the run position. Air should exhaust from the line.

a. If no air exhausts, replace the control valve (para 9-43).
b. If air exhausts, replace the motor (para 9-42).

Table 9-1. Compressed Air and Brake System Troubleshooting Procedures (Continued).

MALFUNCTION .

TEST OR INSPECTION .

CORRECTIVE ACTION .

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19. INTERAXLE DIFFERENTIAL LOCKUP INOPERATIVE :

Disconnect air lines at rear axle; then engage lockup control valve on instrument panel. Check for air pressure at rear axle. No air indicates clogged lines or defective control valve.

a. Replace clogged lines.

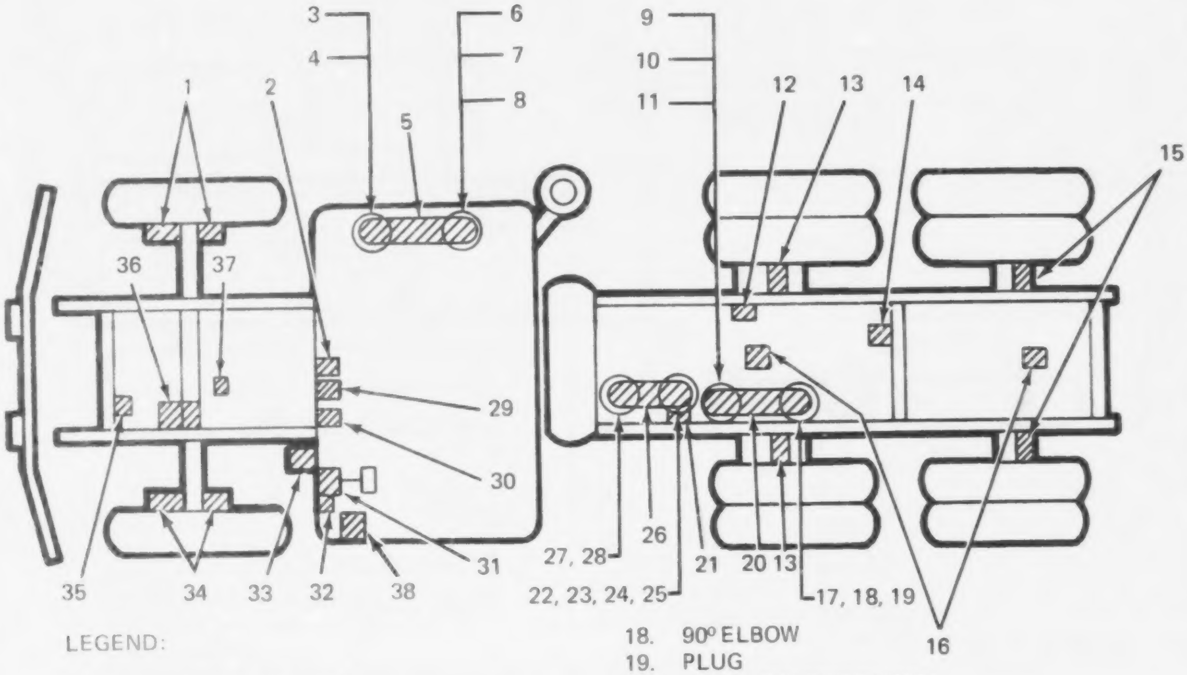
b. Replace defective control valve (para 9-44).

c. If air controls are working normally, refer problem to Direct Support Maintenance.

9-5e. AIR SYSTEM ARRANGEMENT (M915).

NOTE

The components shown below are described in paragraph 2-64.



LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)
2. PARKING BRAKE VALVE
3. DRAIN COCK
4. PLUG (2)
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90° CHECK VALVE
8. 90° ELBOW
9. DRAIN COCK
10. 45° ELBOW
11. 45° CHECK VALVE
12. QUICK RELEASE/DOUBLE CHECK VALVE
13. SPRING AND SERVICE BRAKE CHAMBER (FORWARD-REAR) (2)
14. RELAY VALVE
15. SPRING AND SERVICE BRAKE CHAMBER (REAR-REAR) (2)
16. QUICK RELEASE VALVE
17. ADAPTER
18. 90° ELBOW
19. PLUG
20. PRIMARY RESERVOIR
21. TRACTOR PROTECTION VALVE
22. DRAIN COCK
23. 90° ELBOW
24. AIR HOSE COUPLING
25. SAFETY VALVE
26. SUPPLY RESERVOIR
27. 90° ELBOW (2)
28. CHECK VALVE
29. TRAILER SUPPLY VALVE
30. TRAILER HAND CONTROL BRAKE VALVE
31. DUAL BRAKE VALVE
32. DOUBLE CHECK VALVE
33. DOUBLE CHECK AND STOPLAMP VALVE
34. WEDGE BRAKE AIR CHAMBER (2)
35. LIMITING VALVE
36. AIR COMPRESSOR/GOVERNOR
37. CHECK VALVE
38. AIR DRYER

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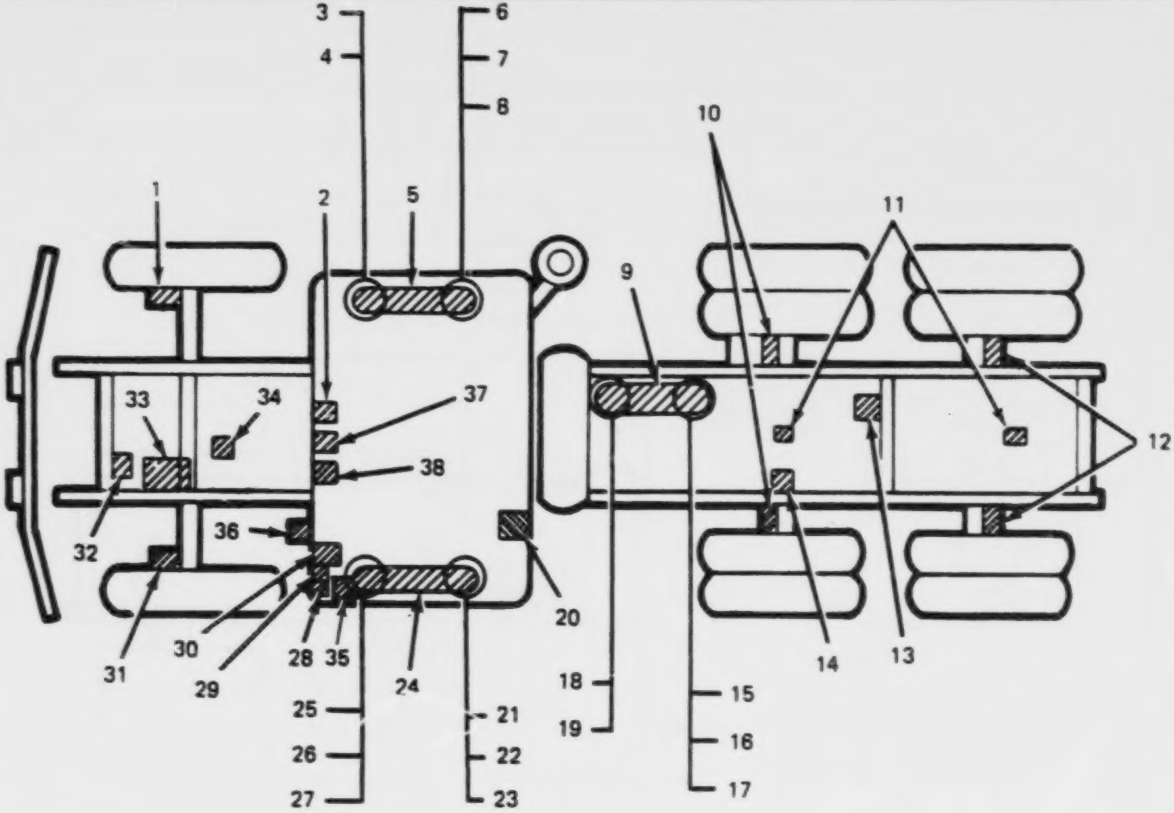
9-5f. AIR SYSTEM ARRANGEMENT (M916).



LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90°CHECK VALVE
8. 90°ELBOW
9. PRIMARY RESERVOIR
10. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
11. QUICK RELEASE VALVE (2)
12. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
13. RELAY VALVE
14. QUICK RELEASE AND DOUBLE CHECK VALVE
15. DRAIN COCK
16. 90°ELBOW
17. PLUG
18. ADAPTER (2)
19. CHECK VALVE
20. TRACTOR PROTECTION VALVE
21. AIR HOSE COUPLING
22. 90°ELBOW
23. DRAIN COCK
24. SUPPLY RESERVOIR
25. SAFETY VALVE
26. ADAPTER
27. CHECK VALVE
28. SPRING BRAKE CONTROL VALVE
29. DOUBLE CHECK VALVE
30. DUAL BRAKE VALVE
31. WEDGE BRAKE AIR CHAMBER
32. LIMITING VALVE
33. AIR COMPRESSOR/GOVERNOR
34. CHECK VALVE
35. AIR DRYER
36. DOUBLE CHECK AND STOPLAMP VALVE
37. TRAILER SUPPLY VALVE
38. TRAILER HAND CONTROL BRAKE VALVE

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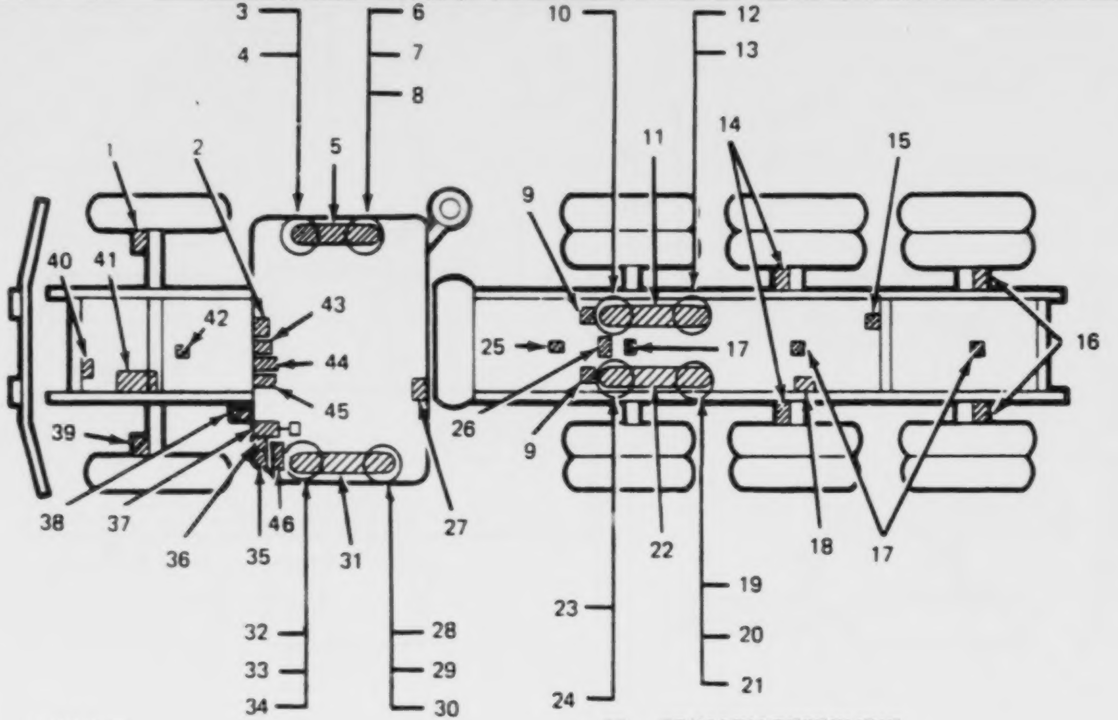
9-5g. AIR SYSTEM ARRANGEMENT (M917).

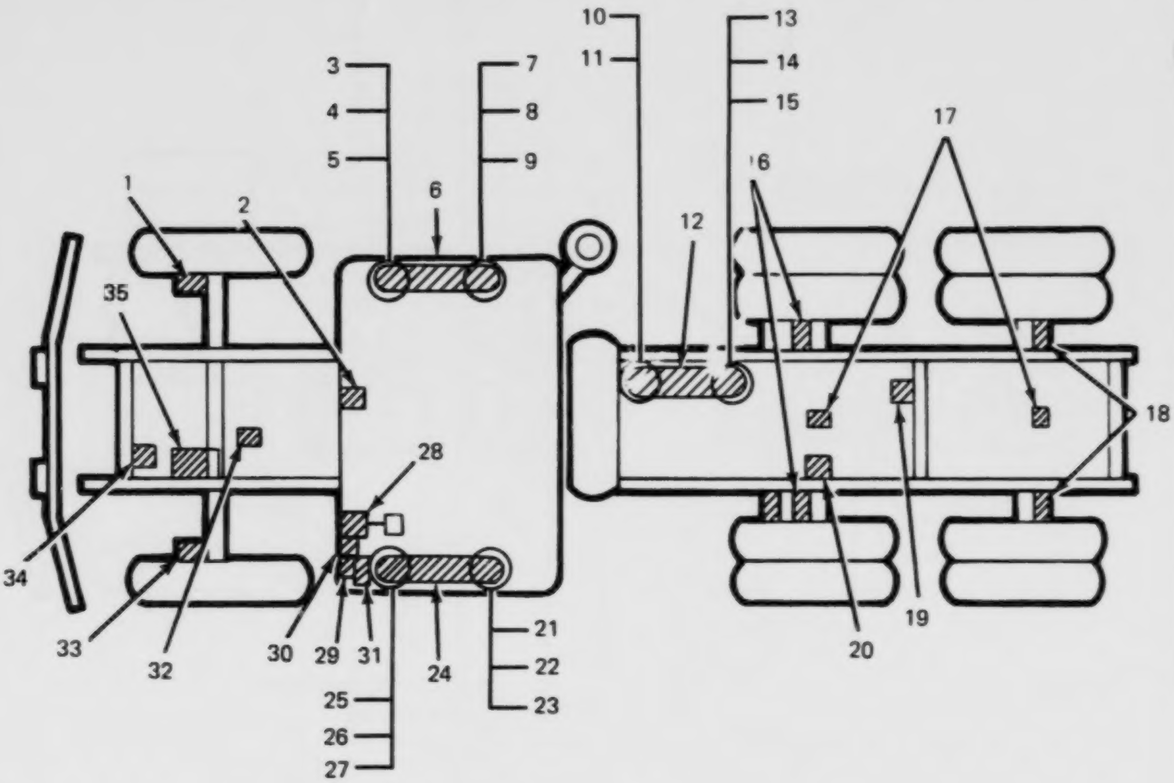


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. DOUBLE CHECK VALVE
7. 90° CHECK VALVE
8. 90° ELBOW
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)
10. PLUG (3)
11. PRIMARY RESERVOIR
12. 45° ELBOW (2)
13. DRAIN COCK
14. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
15. RELAY VALVE
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. QUICK RELEASE VALVE (3)
18. QUICK RELEASE AND DOUBLE CHECK VALVE
19. DRAIN COCK
20. PLUG
21. 45° ELBOW
22. PRIMARY RESERVOIR
23. CHECK VALVE
24. 90° ELBOW (2)
25. EXHAUST VALVE
26. QUICK RELEASE VALVE
27. TRACTOR PROTECTION VALVE
28. DRAIN COCK
29. 90° ELBOW
30. AIR HOSE COUPLING
31. SUPPLY RESERVOIR
32. CHECK VALVE
33. ADAPTER
34. SAFETY VALVE
35. SPRING BRAKE CONTROL VALVE
36. DOUBLE CHECK VALVE
37. DUAL BRAKE VALVE
38. DOUBLE CHECK AND STOPLAMP VALVE
39. WEDGE BRAKE AIR CHAMBER
40. LIMITING VALVE
41. AIR COMPRESSOR/GOVERNOR
42. CHECK VALVE
43. TRAILER SUPPLY VALVE
44. TRAILER HAND CONTROL BRAKE VALVE
45. PRESSURE PROTECTION VALVE
46. AIR DRYER

TA 237225 ■

9-5h. AIR SYSTEM ARRANGEMENT (M918).

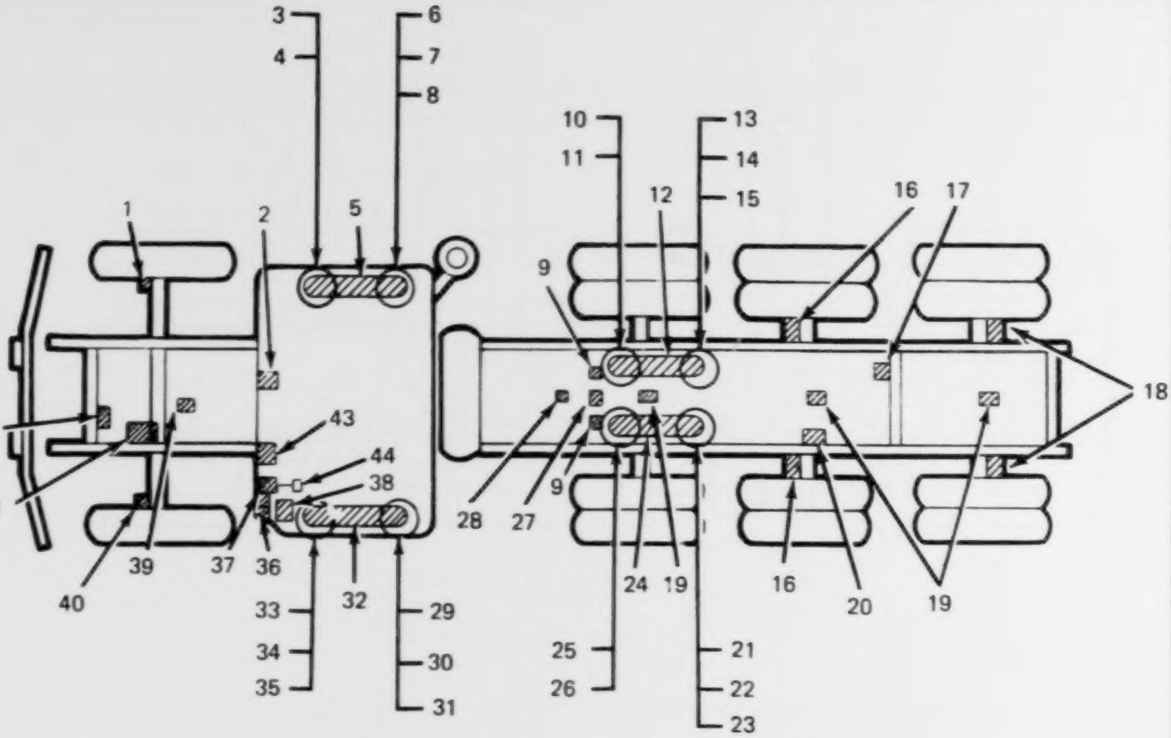


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. VALVE
4. PLUG
5. DRAIN COCK
6. SECONDARY RESERVOIR
7. DOUBLE CHECK VALVE
8. 90º CHECK VALVE
9. 90º ELBOW
10. CHECK VALVE
11. ADAPTER (2)
12. PRIMARY RESERVOIR
13. PLUG
14. 90º ELBOW
15. DRAIN COCK
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. QUICK RELEASE VALVE
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
19. RELAY VALVE
20. QUICK RELEASE AND DOUBLE CHECK VALVE
21. AIR HOSE COUPLING
22. 90º ELBOW
23. DRAIN COCK
24. SUPPLY RESERVOIR
25. CHECK VALVE
26. SAFETY VALVE
27. ADAPTER
28. DUAL BRAKE VALVE
29. SPRING BRAKE CONTROL VALVE
30. DOUBLE CHECK AND STOPLAMP VALVE
31. AIR DRYER
32. CHECK VALVE
33. WEDGE BRAKE AIR CHAMBER
34. LIMITING VALVE
35. AIR COMPRESSOR/GOVERNOR

TA 237226

9-5i. AIR SYSTEM ARRANGEMENT (M919) .

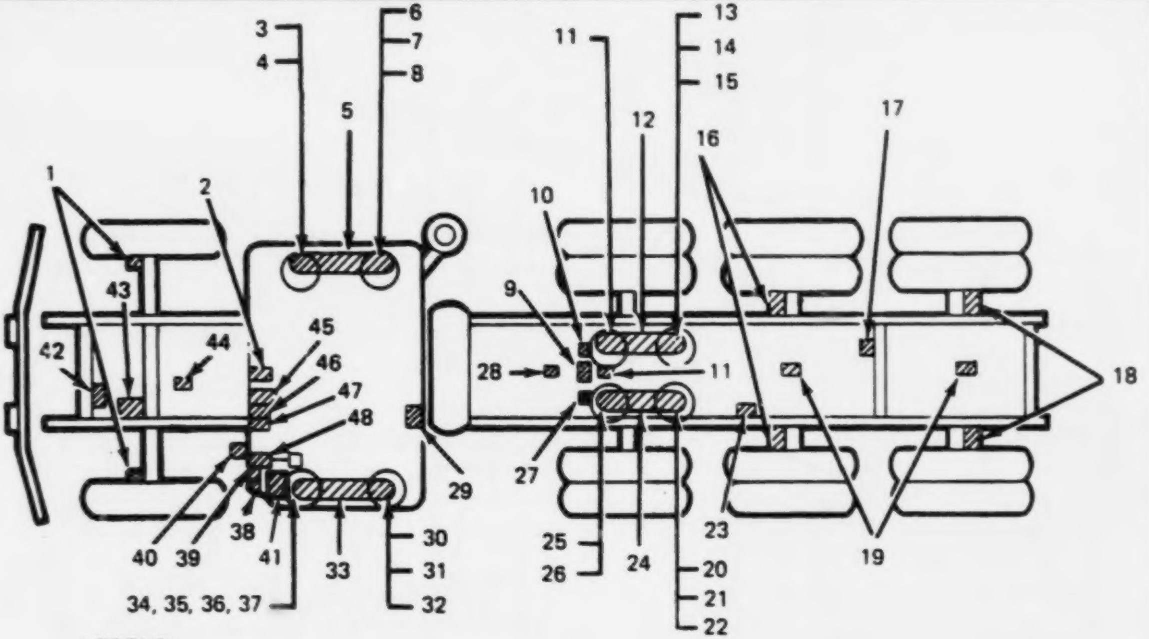


LEGEND:

1. WEDGE BRAKE AIR CHAMBER
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. 90° ELBOW
7. 90° CHECK VALVE
8. DOUBLE CHECK VALVE
9. AIR BRAKE CHAMBER/SLACK ADJUSTER (2)
10. PLUG (2)
11. VALVE
12. PRIMARY RESERVOIR
13. DRAIN COCK
14. 90° ELBOW
15. 45° ELBOW
16. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)
17. RELAY VALVE
18. SPRING AND SERVICE BRAKE AIR CHAMBER/SLACK ADJUSTER (2)
19. QUICK RELEASE VALVE (3)
20. QUICK RELEASE AND DOUBLE CHECK VALVE
21. DRAIN COCK
22. 90° ELBOW
23. PLUG
24. PRIMARY RESERVOIR
25. 90° ELBOW (2)
26. CHECK VALVE
27. QUICK RELEASE VALVE
28. EXHAUST VALVE
29. 90° ELBOW
30. AIR HOSE COUPLING
31. DRAIN COCK
32. SUPPLY RESERVOIR
33. ADAPTER
34. SAFETY VALVE
35. CHECK VALVE
36. SPRING BRAKE CONTROL VALVE
37. DOUBLE CHECK AND STOPLAMP VALVE
38. AIR DRYER
39. CHECK VALVE
40. WEDGE BRAKE AIR CHAMBER
41. AIR COMPRESSOR/GOVERNOR
42. LIMITING VALVE
43. PRESSURE PROTECTION VALVE
44. DUAL BRAKE VALVE

TA 237227 ■

9-5j. AIR SYSTEM ARRANGEMENT (M920).



LEGEND:

1. WEDGE BRAKE AIR CHAMBER (2)
2. PARKING BRAKE VALVE
3. PLUG (2)
4. DRAIN COCK
5. SECONDARY RESERVOIR
6. 90° CHECK VALVE
7. DOUBLE CHECK VALVE
8. 90° ELBOW
9. QUICK RELEASE VALVE
10. AIR BRAKE CHAMBER/SLACK ADJUSTER
11. PLUG (3)
12. PRIMARY RESERVOIR
13. 45° ELBOW
14. 90° ELBOW
15. DRAIN COCK
16. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
17. RELAY VALVE
18. SPRING AND SERVICE BRAKE CHAMBER/SLACK ADJUSTER (2)
19. QUICK RELEASE VALVE (3)
20. 90° ELBOW
21. PLUG
22. DRAIN COCK
23. QUICK RELEASE AND DOUBLE CHECK VALVE
24. PRIMARY RESERVOIR
25. 90° ELBOW (2)
26. CHECK VALVE
27. AIR BRAKE CHAMBER/SLACK ADJUSTER
28. EXHAUST VALVE
29. TRACTOR PROTECTION VALVE
30. DRAIN COCK
31. 90° ELBOW
32. AIR HOSE COUPLING
33. SUPPLY RESERVOIR
34. DOUBLE CHECK VALVE
35. PLUG
36. SAFETY VALVE
37. CHECK VALVE
38. SPRING BRAKE CONTROL VALVE
39. DOUBLE CHECK VALVE
40. DOUBLE CHECK AND STOPLAMP VALVE
41. AIR DRYER
42. LIMITING VALVE
43. AIR COMPRESSOR/GOVERNOR
44. CHECK VALVE
45. TRAILER SUPPLY VALVE
46. PRESSURE PROTECTION VALVE
47. HAND CONTROL TRAILER BRAKE VALVE
48. DUAL BRAKE VALVE

TA 237228 ■

Section III MAINTENANCE PROCEDURES

9-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the compressed air and brake systems. To find a specific maintenance procedure, see one of the following task summaries.

a. Compressed Air System (para 9-7).
b. Brake System (para 9-8).
c. Auxiliary Air-Powered Component Systems (para 9-9).

9-7. COMPRESSED AIR SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
All.	9-13A.	Air Reservoirs Drained.

MATERIALS/PARTS (P/N)

Gasket (5330-00-755-7191).
Soap Solution.
Silicone Sealant (Refer to Appendix C).
Controllable Shop Air Supply.
Non Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
Tape, Antiseizing Item 14, Appendix C.
Check Valve, 275756 (06853).
Air Pressure Gage.
Marking Pen.
Masking Tape.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.
Work in Well Ventilated Area Away From Sparks and Flames.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Air Dryer Dehydrate Cartridge Replacement:	9-10	
		9-10A	
2.	Air Dryer Replacement:	9-11	
	a. Removal.	9-11A	
	b. Installation.	9-11B	
	c. Checking for Leaks.	9-11C	
2.1	Air Dryer Repair.	9-11.1	

9-7. COMPRESSED AIR SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Supply Reservoir Automatic Drain Valve and Air Hose Coupling:	9-12	9-1
	a. Removal.	9-12A	
	b. Installation.	9-12B	
	c. Checking for Leaks.	9-12C	
4.	Secondary Reservoir Manual Drain Valve Maintenance:	9-13	9-1
	a. Bleeding Reservoirs.	9-13A	
	b. Removal.	9-13B	
	c. Installation.	9-13C	
	d. Checking for Leaks.	9-13D	
5.	Safety Release Valve Maintenance:	9-14	9-1
	a. Removal.	9-14A	
	b. Testing.	9-14B	
	c. Installation.	9-14C	
	d. Operational Check.	9-14D	
6.	Supply Reservoir Check Valve Maintenance:	9-15	9-1
	a. Removal.	9-15A	
	b. Testing.	9-15B	
	c. Installation.	9-15C	
	d. Operational Check.	9-15D	
7.	Reservoirs and Air Lines Maintenance:	9-16	9-1
	a. Removal.	9-16A	
	b. Installation.	9-16B	
	c. Checking for Leaks.	9-16C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Snap Ring Pliers.
Brake Spring Pliers.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen.
Soap and Water Solution.
Seal, 1205-E-1409 (78500).
GAA (Refer to Appendix C).
Cotter Pin, K-227 (78500).
Cotter Pin, 210490 (06853).
Cotter Pin, 210492 (06853).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
5-37A.	Batteries Disconnected.
9-27A and 9-28A.	Double Check Valve Removed.
10-13A.	Hub and Drum Assembly Removed (M915).
10-14A.	Hub and Drum Assembly Removed (M916 Thru M920).
(See TM 9-2320-273-10).	Wheel Raised OFF Ground; Park Brake Should Be Released and Wheels Blocked.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Trailer Supply Brake Valve :	9-17	9-1
	a. Removal.	9-17A	
	b. Inspection of Lines and Fittings.	9-17B	
	c. Installation.	9-17C	
	d. Operational Check.	9-17D	
2.	Trailer Hand Brake Valve :	9-18	9-1
	a. Removal.	9-18A	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Trailer Hand Brake Valve (Continued):		
	b. Inspection of Air Lines and Fittings.	9-18B	
	c. Installation.	9-18C	
	d. Operational Check.	9-18D	
3.	Parking Brake Valve :	9-19	9-1
	a. Removal.	9-19A	
	b. Inspection of Lines and Fittings.	9-19B	
	c. Installation.	9-19C	
	d. Operational Check.	9-19D	
4.	Air Pressure Gages Maintenance :	9-20	9-1
	a. Removal.	9-20A	
	b. Installation.	9-20B	
	c. Operational Check.	9-20C	
5.	Brake Pedal and Valve Maintenance :	9-21	9-1
	a. Pedal Removal.	9-21A	
	b. Valve Removal.	9-21B	
	c. Valve Installation.	9-21C	
	d. Pedal Installation.	9-21D	
	e. Operational Check.	9-21E	
6.	Service Brakes Quick Release Valve :	9-22	9-1
	a. Removal.	9-22A	
	b. Installation	9-22B	
	c. Operational Check.	9-22C	
7.	Quick-Release/Double-Check Valve Maintenance:	9-23	9-1
	a. Removal.	9-23A	
	b. Installation.	9-23B	
	c. Operational Check.	9-23C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
8.	Relay Valve Maintenance:	9-24	9-1
	a. Removal.	9-24A	
	b. Installation.	9-24B	
	c. Checking for Leaks.	9-24C	
9.	Limiting Valve Maintenance:	9-25	9-1
	a. Removal.	9-25A	
	b. Installation.	9-25B	
	c. Operational Check.	9-25C	
10.	Tractor Protection Valve Maintenance:	9-26	9-1
	a. Removal.	9-26A	
	b. Installation.	9-26B	
	c. Operational Check.	9-26C	
11.	Double Check Valve Maintenance:	9-27	9-1
	a. Removal.	9-27A	
	b. Installation.	9-27B	
	c. Checking for Leaks.	9-27C	
12.	Double Check and Stoplamp Valve Maintenance (M918 and M919):	9-28	9-1
	a. Removal.	9-28A	
	b. Installation.	9-28B	
	c. Operational Check.	9-28C	
13.	Double Check and Stoplamp Valve Maintenance (M915, M916, M917, M920):	9-29	9-1
	a. Removal.	9-29A	
	b. Installation.	9-29B	
	c. Operational Check.	9-29C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
14.	External Air Couplings Maintenance:	9-30	9-1
	a. Removal.	9-30A	
	b. Installation.	9-30B	
15.	Front Brake Shoes Maintenance (M915):	9-31	9-1
	a. Removal.	9-31A	
	b. Inspection.	9-31B	
	c. Installation.	9-31C	
	d. Adjustment.	9-31D	
16.	Front Brake Shoes Maintenance (M916 Thru M920):	9-32	9-1
	a. Removal.	9-32A	
	b. Inspection.	9-32B	
	c. Installation.	9-32C	
	d. Adjustment.	9-32D	
17.	Rear Brake Shoes Maintenance (M915):	9-33	9-1
	a. Removal.	9-33A	
	b. Inspection.	9-33B	
	c. Installation.	9-33C	
18.	Rear Brake Shoes Maintenance (M916 thru M920).	9-34	9-1
	a. Removal.	9-34A	
	b. Inspection.	9-34B	
	c. Installation.	9-34C	

9-8. BRAKE SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
19.	Pusher Axle Brake Shoes Maintenance:	9-35	9-1
	a. Removal.	9-35A	
	b. Inspection.	9-35B	
	c. Installation.	9-35C	
	d. Adjustment.	9-35D	
20.	Front Brake Air Chamber Maintenance:	9-36	9-1
	a. Removal.	9-36A	
	b. Disassembly.	9-36B	
	c. Reassembly.	9-36C	
	d. Installation.	9-36D	
	e. Operational Check.	9-36E	
21.	Rear Brake Air Chamber Maintenance:	9-37	9-1
	a. Caging Power Spring.	9-37A	
	b. Removal.	9-37B	
	c. Installation.	9-37C	
	d. Uncaging Power Spring.	9-37D	
	e. Operational Check.	9-37E	
22.	Pusher Axle Brake Air Chamber Maintenance:	9-38	9-1
	a. Removal.	9-38A	
	b. Disassembly.	9-38B	
	c. Assembly.	9-38C	
	d. Installation.	9-38D	
23.	Slack Adjusters Maintenance:	9-39	9-1
	a. Adjustment — Slack Adjuster (Forward Rear Tandem).	9-39A	
	b. Adjustment — Push Rod (Rear Rear Tandem).	9-39B	

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9-9. AUXILIARY AIR-POWERED COMPONENT SYSTEMS MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen
Soap and Water Solution.
Gasket (4730-01-055-4013).

PERSONNEL REQUIRED

One or Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.
9-13A.	Air Reservoirs Drained.
5-83A.	Differential Lock-up Switch Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Windshield Washers Maintenance :	9-40	9-1
	a. Removal.	9-40A	
	b. Installation.	9-40B	
	c. Operational Check.	9-40C	
2.	Windshield Washer Control Maintenance :	9-41	9-1
	a. Removal.	9-41A	
	b. Inspection of Air Lines	9-41B	

9-9. AUXILIARY AIR-POWERED COMPONENT SYSTEMS MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Windshield Washer Control Maintenance (Continued):		
	c. Installation.	9-41C	
	d. Operational Check.	9-41D	
3.	Windshield Wiper Motor Maintenance:	9-42	9-1
	a. Removal.	9-42A	
	b. Installation.	9-42B	
	c. Operational Check.	9-42C	
4.	Windshield Wiper Control Maintenance:	9-43	9-1
	a. Removal.	9-43A	
	b. Inspection of Air Lines.	9-43B	
	c. Installation.	9-43C	
	d. Operational Check.	9-43D	
5.	Differential Lockup Control Valve Maintenance:	9-44	9-1
	a. Removal.	9-44A	
	b. Installation.	9-44B	
	c. Checking for Leaks.	9-44C	
6.	Air Horn and Control Valve Maintenance:	9-45	9-1
	a. Removal.	9-45A	
	b. Installation.	9-45B	
	c. Operational Check.	9-45C	

BRAKE SYSTEM.

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(0.4)
b. Cleaning and Inspection.	(0.3)
c. Installation.	(0.6)
	1.3 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease, Silicone, Lubrication Item, Appendix B.
Dehydrate Cartridge Assembly (06853) 286968.
Tape, Antiseizing Item 14, Appendix C.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10.	Air System Draincocks Opened.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

BRAKE SYSTEM.

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Air dryer does not have to be removed from vehicle for this operation.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Electrical terminal (14).	a. Remove insulating boot (8), nut (13) and electrical wire (7). b. Disconnect hose assembly (6) from connector (12).	
2. End cover assembly (5).	Loosen three screws (10) and turn three retaining clips (11) inward so they do not touch air dryer housing (1).	

NOTE

Make alinement marks on the end cover assembly and air dryer housing. This will help you aline them during reassembly.

LOCATION/ITEM	ACTION	REMARKS
3. End cover assembly (5).	While pressing up on end cover assembly (5) pry out retaining ring (9) using flat tip screwdriver.	
4. Air dryer housing (1).	Remove end cover assembly (5).	Discard O-ring (4).
5.	Using 3/4 inch socket wrench unscrew and remove dehydrate cartridge (3).	Discard cartridge.

B. CLEANING AND INSPECTION.

CAUTION

Do not put end cover assembly into cleaning solvent. This could damage the heating element or thermostat.

NOTE

Make sure all cleaning solvent residue has been removed before reassembly.

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).

C. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
6. Air dryer housing (1).	a. Lubricate O-ring (2) with silicone grease. b. Using 3/4 inch socket wrench screw in and tighten new dehydrate cartridge (3).	Torque to 32 lb-ft.
7.	Lubricate O-ring (4) with silicone grease and install in groove.	

NOTE

Assistant may be required for this step.

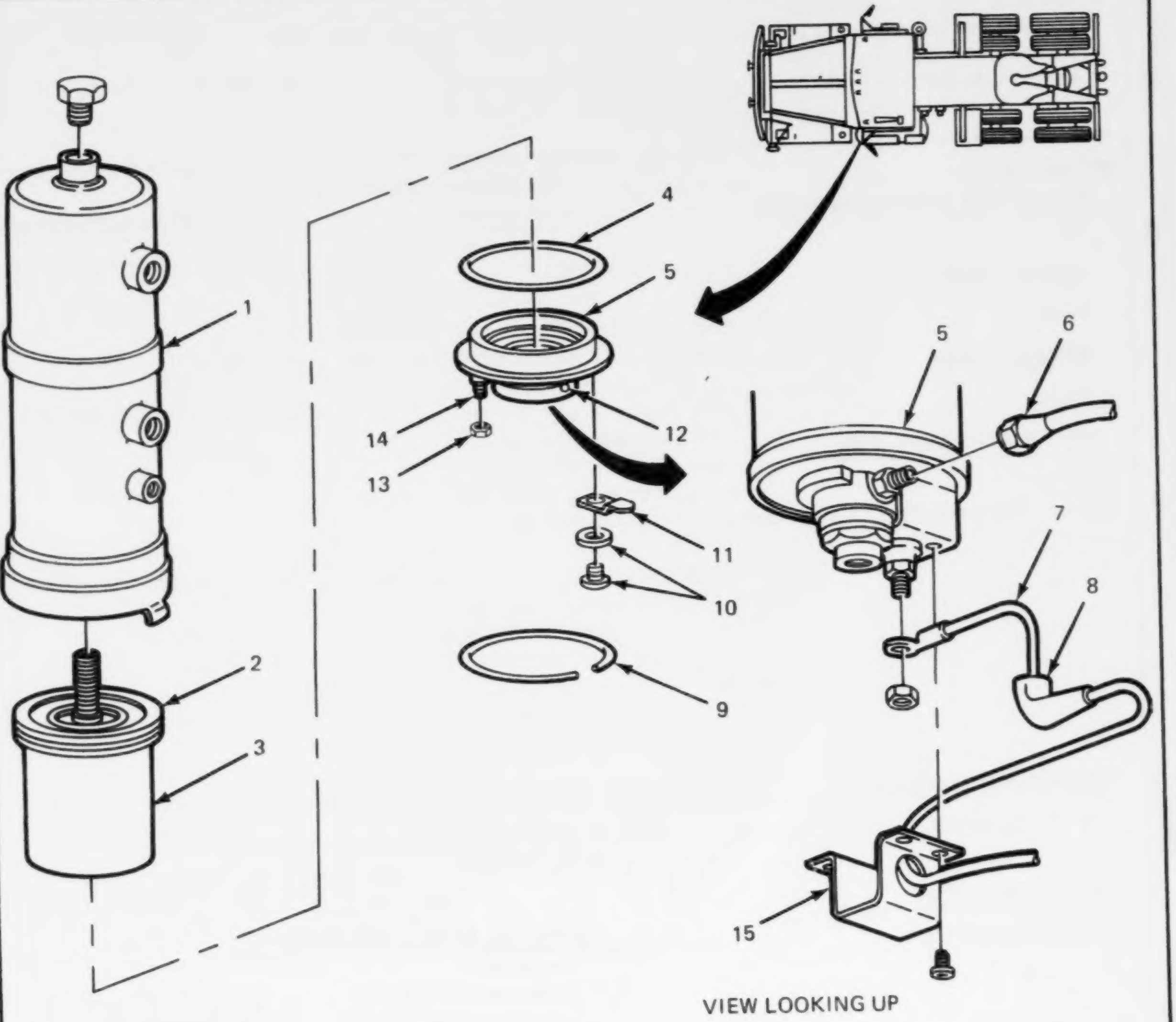
LOCATION/ITEM	ACTION	REMARKS
8.	a. Join alinement marks and press end cover assembly (5) up as far as it will go. b. Secure with retaining ring (9).	
9. Three retaining clips (11).	Turn outward and over the edge of air dryer housing (1) and tighten three screws (10).	
10. Electrical terminal (14).	Install electrical wire (7), nut (13) and insulating boot (8).	
11. End cover assembly (5).	Apply antiseizing tape and connect hose assembly (6) to connector (12).	

NOTE

Follow-on maintenance action required: Pressurize air system and check for leaks and proper operation.

9-10. AIR DRYER DEHYDRATE CARTRIDGE REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. AIR DRYER HOUSING
2. O-RING (PART OF DEHYDRATE CARTRIDGE)
3. DEHYDRATE CARTRIDGE
4. O-RING
5. END COVER ASSEMBLY
6. HOSE ASSEMBLY
7. ELECTRICAL WIRE (AIR DRYER HEATER)
8. INSULATING BOOT
9. RETAINING RING
10. SCREW AND WASHER (3)
11. RETAINING CLIP (3)
12. CONNECTOR
13. NUT
14. ELECTRICAL TERMINAL
15. TERMINAL PROTECTOR

TA 237229

BRAKE SYSTEM.

9-11. AIR DRYER REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(1.0)
b. Cleaning and Inspection.	(0.2)
c. Installation.	(1.0)
d. Operational Check.	(0.3)
	2.5 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape, Antiseizing Item 14, Appendix C.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10.	Air System Draincocks Opened.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air dryer assembly (1).	Unscrew and remove hoses (3) and (11) and tubing (2).	
2. Electrical terminal (17).	Remove terminal protector (14), boot (13), nut (15) and wire (12).	
	NOTE For the M916 thru M920 only, disconnect tube (23) from top of air dryer assembly (1).	
3. Mounting brackets (21).	Remove four hexagon nuts (8), four lock washers (9), four flat washers (10) and (19), four capscrews (20) and dryer assembly (1).	
4. Frame bracket (7).	Remove four screws (6), four nuts (4), four washers (5) and two air dryer mounting brackets (21).	
5. Purge tank reservoir (25).	Unscrew and remove tubing (23).	
6. Four nuts (26) and four lock washers (27).	Unscrew and remove U-bolts (24) and purge tank reservoir (25).	
B. CLEANING AND INSPECTION.		
7.	Clean and inspect all parts.	
C. INSTALLATION.		
8. Air dryer brackets (21), frame bracket (7).	Secure with four screws (6), four washers (5) and four nuts (4).	
	NOTE There should be 1/2 inch minimum clearance between fuel tank and mounting brackets (21). This may require moving the fuel tank rearward.	

BRAKE SYSTEM.

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
9. Air dryer assembly (1).	Secure to mounting brackets (21) with four capscrews (20), four flat washers (19) and (10), four lock washers (9) and four hexagon nuts (8).	
10. Air dryer head assembly (22), electrical terminal (17).	Install wire (12), secure with nut (15). Install boot (13) and terminal protector (14).	
11. Air dryer assembly (1).	Apply antiseizing tape, install tubing (2), hoses (3) and (11).	
	NOTE For the M916 thru M920 only, apply antiseizing tape and install tube (23) on air dryer assembly (1).	
12. Cab mounting bracket (28), purge tank reservoir (25).	Secure with U-bolts (24), four lock washers (27), and four nuts (26).	
13. Tubing (23).	Apply antiseizing tape and connect to purge tank reservoir (25).	
D. OPERATIONAL CHECK.		
	WARNING Make sure wheels are blocked and transmission is in neutral. Failure to do this could cause injury or death to persons working in and around vehicle.	
14. Air system.	Close draincocks.	
15. Engine.	a. Start up (see TM 9-2320-273-10). b. Charge air system to 100 psi.	
16. Air dryer assembly (1).	Check for air leakage at exhaust cover (18), or any air line connections.	

BRAKE SYSTEM.

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK (Continued).		
17.	Allow system to reach operating pressure, a sharp burst of air should escape from exhaust cover (18).	

NOTE

Step number 18 must be done in temperatures below 50°F (9.9°C).

LOCATION/ITEM	ACTION	REMARKS
18. Air dryer assembly (1).	Run engine for a minimum of five minutes, end cover (22) should be warm if not replace the heating element.	

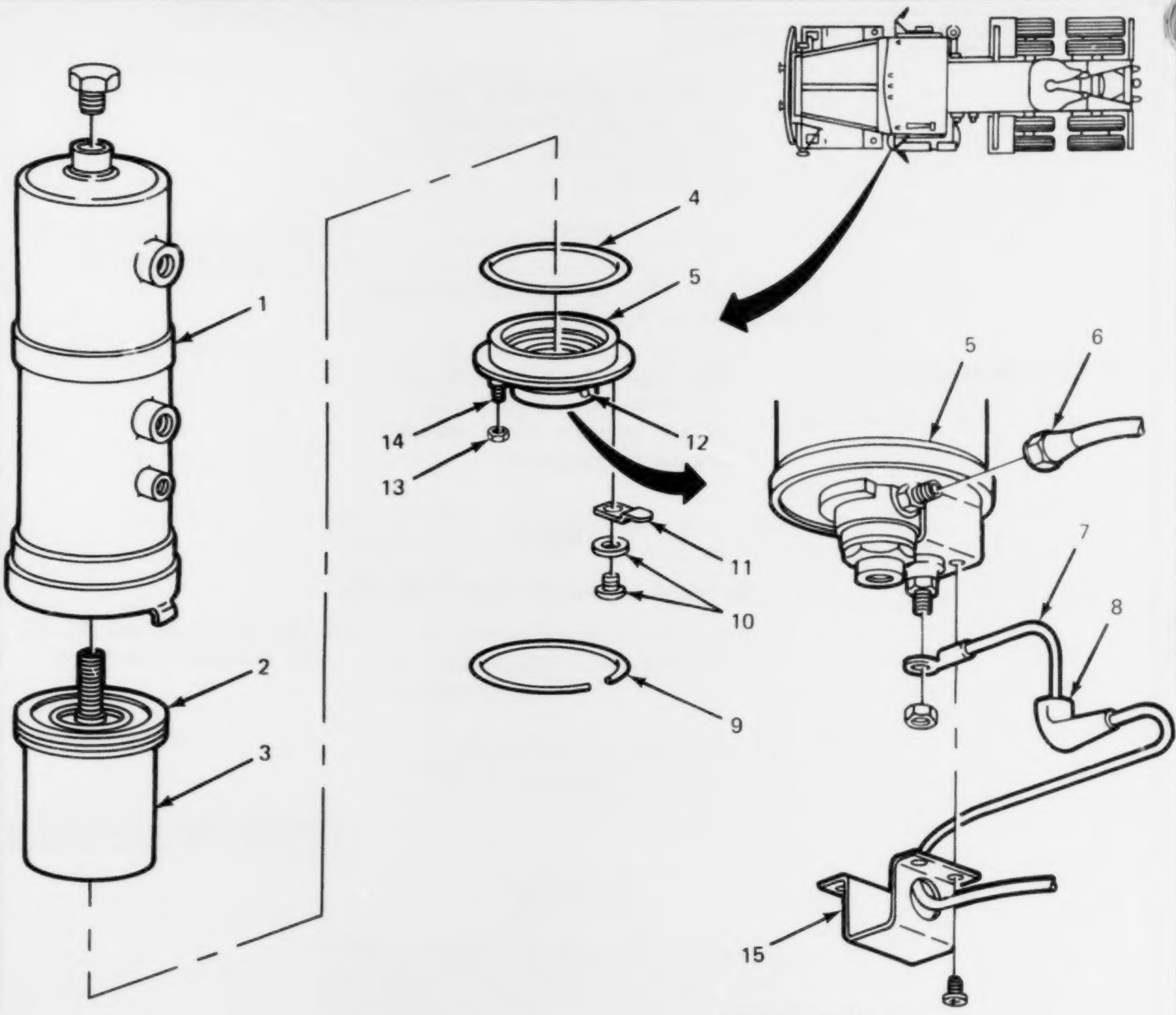
NOTE

No follow-on maintenance is required.

BRAKE SYSTEM.

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS



VIEW LOOKING UP

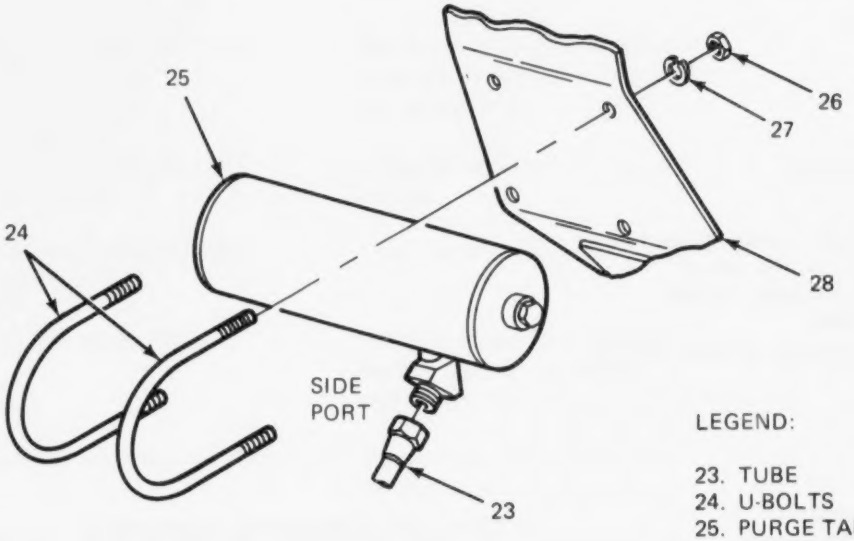
LEGEND:

1. AIR DRYER HOUSING
2. O-RING (PART OF DEHYDRATE CARTRIDGE)
3. DEHYDRATE CARTRIDGE
4. O-RING
5. END COVER ASSEMBLY
6. HOSE ASSEMBLY
7. ELECTRICAL WIRE (AIR DRYER HEATER)
8. INSULATING BOOT
9. RETAINING RING
10. SCREW AND WASHER (3)
11. RETAINING CLIP (3)
12. CONNECTOR
13. NUT
14. ELECTRICAL TERMINAL
15. TERMINAL PROTECTOR

TA 237230

9-11. AIR DRYER REPLACEMENT (Continued).

LOCATION/ITEM	ACTION	REMARKS


25
24
26
27
28
SIDE PORT
23

LEGEND:

23. TUBE
24. U-BOLTS
25. PURGE TANK RESERVOIR
26. NUTS
27. LOCK WASHERS
28. CAB MOUNTING BRACKET

TA 237231

BRAKE SYSTEM.

9-11.1. AIR DRYER REPAIR.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Disassembly.	(1.0)
b. Cleaning.	(0.3)
c. Inspection and Repair.	(0.4)
d. Assembly.	(1.0)
	2.7 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease, Silicone, Lubrication Item, Appendix C.
Tape, Antiseizing Item 14, Appendix C.
Kit, Check Valve Repair (06853) 287298.
Kit, Seal (06853) 287053.
Dehydrate Cartridge Assembly (06853) 286968.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-11.	Air Dryer Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

9-11.1. AIR DRYER REPAIR (Continued).

A. DISASSEMBLY.

NOTE

Add location marks between end cover housing (35) and air dryer housing (2) prior to disassembly. This will help you aline them correctly during reassembly.

LOCATION/ITEM	ACTION	REMARKS
1. End cover housing (35).	Remove three screws (38) and three retaining clips (37).	
2. End cover assembly (17).	While pressing inward remove retaining ring (39) with a flat tip screwdriver.	
3. End cover housing (35), O-ring (16).	Unscrew and remove, discard O-ring.	
4. End cover housing (35), connector (36).	Unscrew and remove.	
5. Exhaust cover (28).	Remove screw (30), recessed washer (31) and exhaust diaphragm (32).	
6. Purge valve assembly (18).	Remove 3 screws (29) and exhaust cover (28).	
7. Air dryer end cover housing (35).	Remove purge valve assembly (18), by unscrewing purge valve housing (24).	Discard O-rings (22) and (23).
8. Purge valve housing (24).	Remove screw (27), purge valve piston (20), spring (21), purge valve (25), lock washer (26) and O-ring (19). Discard O-ring, spring and purge valve.	
9. Dehydrate cartridge (15).	Unscrew and remove from air dryer housing (2) using a 3/4-inch socket wrench.	Discard dehydrate cartridge.
10. Safety valve (13), and connector (11).	Unscrew and remove from air dryer housing (2).	
11. Air dryer housing (2).	Unscrew and remove check valve (3). Remove O-ring (9).	Discard O-ring (9).

9-11.1. AIR DRYER REPAIR (Continued).

A. DISASSEMBLY (Continued).

LOCATION/ITEM	ACTION	REMARKS
12.	Unscrew and remove valve body (10) from end cap (4). Remove ball (5), spring (6), spring guide (7) and sealing washer (8).	Discard ball, spring and sealing washer.
13.	Remove two pipe plugs (1) and nipple (12).	

NOTE

Mark the positions of the air dryer assembly mounting brackets (40) on the air dryer housing (2). The position of these mounting brackets is important when installing the air dryer to the vehicle.

LOCATION/ITEM	ACTION	REMARKS
14. Two nuts (41).	Loosen and remove.	
15. Two lock washers (42).	Remove.	
16. Two screws (43).	Remove.	
17. Two mounting brackets (40).	Remove from air dryer housing (2).	

NOTE

For M916 thru M920 only, remove elbow (45) and reducer (46) from air dryer housing (2).

B. CLEANING.

CAUTION

Do not immerse (soak) end cover housing in cleaning solution. The end cover housing contains a thermostat and heating element which could be damaged.

LOCATION/ITEM	ACTION	REMARKS
18.	Clean all parts.	

9-11.1. AIR DRYER REPAIR (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSPECTION AND REPAIR.		
	NOTE All repair consists of replacing defective parts discovered during inspection and replacing discarded parts with new items provided.	
19.	Inspect all parts for damage and serviceability.	
20. End cover assembly (17).	a. Connect a 12VDC source to end cover housing (35). Connect a positive lead to electrical terminal (34), and a negative lead to the outer shell of the head assembly. b. Expose end cover housing (35) to temperatures below 50°F (9.9°C). If the heating element is working properly the outer shell should become warmer within a few minutes. If the outer shell does not become warmer, the end cover housing must be replaced.	
D. ASSEMBLY.		
	NOTE When installing two mounting brackets (40), aline them with the marks on the air dryer housing (2).	
21. Air dryer housing (2), two mounting brackets (40).	a. Install two screws (43). b. Install and tighten two lockwashers (42) and two nuts (41).	
22. Air dryer housing (2).	Apply antiseizing tape and install nipple (12) and two pipe plugs (1).	

BRAKE SYSTEM.

9-11.1. AIR DRYER REPAIR (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. ASSEMBLY (Continued).		

NOTE

For the M916 thru M920 only, apply antiseizing tape and install reducer (46) and elbow (45) in air dryer housing (2).

23. Valve body (10).	Install new sealing washer (8), spring guide (7) with rounded bottom first in valve body. Install new spring (6) in groove of spring guide (7) and place new ball (5) on spring.	
24.	a. Lubricate end cap (4) with silicone grease. Screw in and torque to 200 - 225 lb-in (280 - 315 N.m). b. Lubricate new O-ring (9) with silicone grease, and install.	
25. Air dryer housing (2).	Screw in and tighten check valve (3).	
26. Valve body (10).	Apply antiseizing tape. Screw in and tighten connector (11).	

CAUTION

Make sure exhaust hole in safety valve points downward when in place.

27. Air dryer housing (2).	a. Apply antiseizing tape to safety valve (13). b. Screw in and tighten.	
28.	a. Lubricate O-ring (14) on dehydrate cartridge (15) with silicone grease. b. Screw in dehydrate cartridge (15), tighten using a 3/4-in. socket wrench. Torque to 32 lb-ft (43.3 N.m).	

9-11.1. AIR DRYER REPAIR (Continued).

D. ASSEMBLY (Continued).

LOCATION/ITEM	ACTION	REMARKS
29. End cover housing (35), connector (36).	Apply antiseizing tape, screw in and tighten.	
30. New O-ring (19).	Lubricate with silicone grease and install on purge valve piston (20).	
31. Purge valve housing (24).	a. Lubricate purge valve piston (20) with silicone grease. b. Install purge valve piston (20), new spring (21), new purge valve (25) (rubber end goes in first), new lockwasher (26) and screw (27). Torque screw to 50 lb-in (67.8 N.m).	
32. New O-rings (22) and (23).	Lubricate with silicone grease and install on purge valve housing (24).	
33. Purge valve assembly (18).	Lubricate with silicone grease, screw into end cover housing (35).	
34. Exhaust diaphragm (32), diaphragm washer (31) and screw (30).	Install into new exhaust cover (28).	The rounded end of diaphragm washer should be facing the exhaust diaphragm.
35. Exhaust cover (28).	Install on purge valve assembly (18) using three screws (29).	
36. New O-ring (16).	Lubricate with silicone grease and install into groove on air dryer housing (2).	

NOTE

Assistant may be required for this step.

LOCATION/ITEM	ACTION	REMARKS
37. End cover assembly (17).	Lubricate with silicone grease, press into air dryer housing (2) as far as it will go. Install retaining ring (39) and secure with three retaining clips (37) and three screws (38).	

BRAKE SYSTEM.

9-11.1. AIR DRYER REPAIR (Continued).

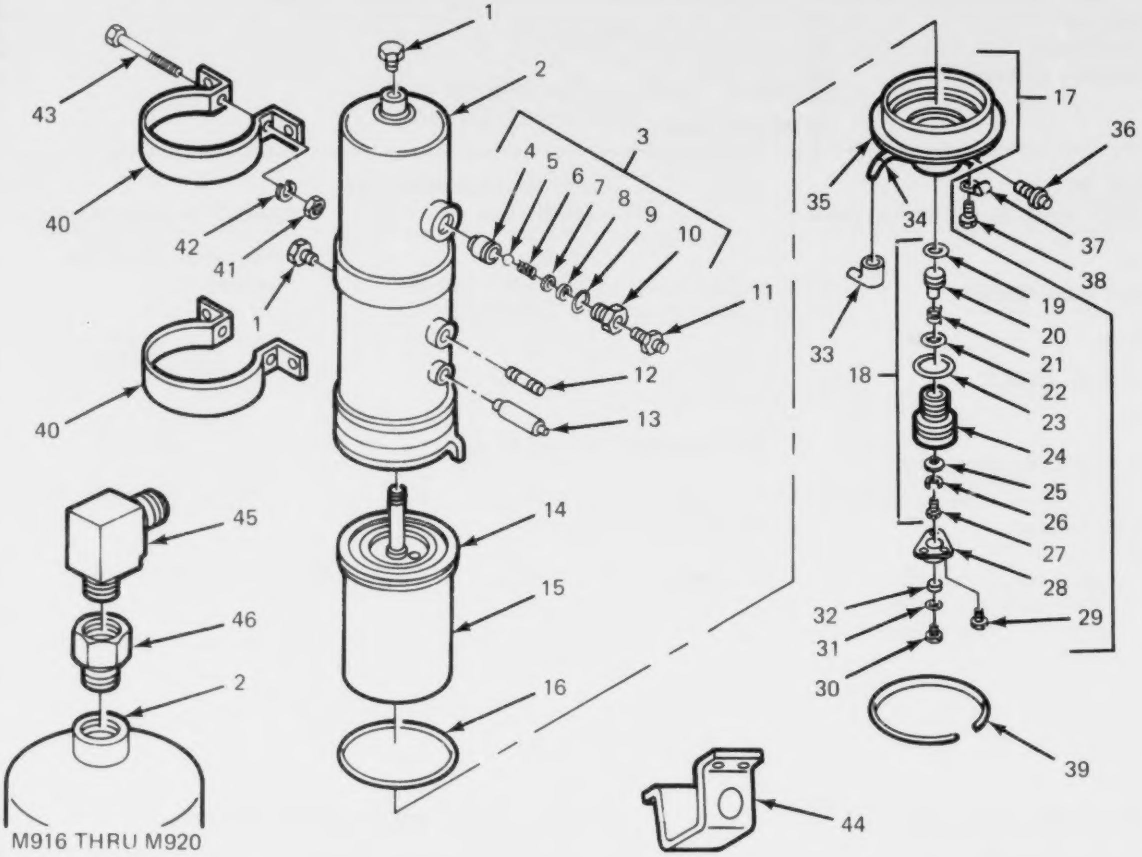
LOCATION/ITEM	ACTION	REMARKS
D. ASSEMBLY (Continued).		
38. Boot (33).	Place in plastic bag and tape to air dryer assembly for use during installation.	

NOTE

Follow-on maintenance action required: Install air dryer (para 9-11c).

9-11.1. AIR DRYER REPAIR (Continued).

LOCATION/ITEM	ACTION	REMARKS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M916 THRU M920

LEGEND:

1. PIPE PLUG (2)
2. AIR DRYER HOUSING
3. CHECK VALVE
4. END CAP
5. BALL
6. SPRING
7. SPRING GUIDE
8. SEALING WASHER
9. O-RING
10. VALVE BODY
11. CONNECTOR
12. NIPPLE
13. SAFETY VALVE
14. O-RING (PART OF DEHYDRATE CARTRIDGE)
15. DEHYDRATE CARTRIDGE
16. O-RING
17. END COVER ASSEMBLY
18. PURGE VALVE ASSEMBLY
19. O-RING
20. PURGE VALVE PISTON
21. SPRING
22. O-RING
23. O-RING
24. PURGE VALVE HOUSING
25. PURGE VALVE
26. LOCKWASHER
27. SCREW
28. EXHAUST COVER
29. SCREW (3)
30. SCREW
31. DIAPHRAGM WASHER
32. EXHAUST DIAPHRAGM
33. BOOT
34. ELECTRICAL TERMINAL
35. END COVER HOUSING
36. CONNECTOR
37. RETAINING CLIP (3)
38. SCREW (3)
39. RETAINING RING
40. MOUNTING BRACKET (2)
41. NUT (2)
42. LOCKWASHER (2)
43. SCREW (2)
44. TERMINAL PROTECTOR
45. ELBOW
46. REDUCER

TA 237232

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Checking for Leaks.	(5)
	15 Minutes Total .

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Primary Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING (Continued).

NOTE

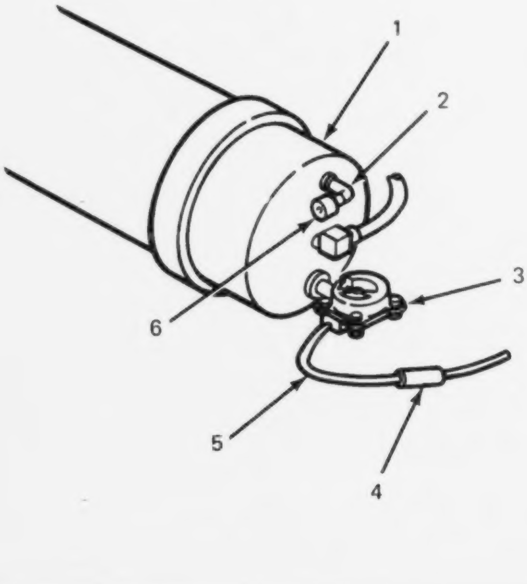
For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

WARNING

Do not remove drain valve until primary air reservoir(s) are fully drained.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Wire (5).	Unplug at connector (4).	
2. Drain valve (3).	Unscrew from supply reservoir (1) and remove.	
3. Air hose coupling (6).	Unscrew from elbow (2).	If elbow (2) has been leaking, unscrew and remove it.



LEGEND:

1. SUPPLY RESERVOIR
2. ELBOW
3. DRAIN VALVE
4. CONNECTOR
5. WIRE
6. AIR HOSE COUPLING

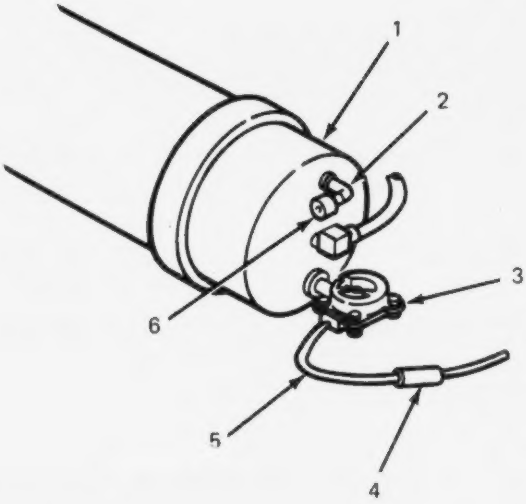
TA 074898

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Drain valve (3).	a. Coat threads with liquid teflon. b. Screw into supply reservoir (1) and tighten.	
5. Elbow (2) and air hose coupling (6).	a. Coat threads with liquid teflon. b. Screw elbow (2) into supply reservoir (1). c. Screw air hose coupling (6) into elbow (2).	
C. CHECKING FOR LEAKS.		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 90-120 psi (621-827 kPa).	
7. Drain valve (3), supply reservoir (1), elbow (2), and air hose coupling (6).	Use soap solution to check for leaks.	
8. Engine.	Shut down (see TM 9-2320-273-10).	

9-12. SUPPLY RESERVOIR AUTOMATIC DRAIN VALVE AND AIR HOSE COUPLING (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SUPPLY RESERVOIR
2. ELBOW
3. DRAIN VALVE
4. CONNECTOR
5. WIRE
6. AIR HOSE COUPLING

TA 074899

COMPRESSED AIR SYSTEM.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Bleeding Reservoirs.	(2)
b. Removal.	(1)
c. Installation.	(2)
d. Checking for Leaks.	(5)
	10 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).

LOCATION/ITEM | **ACTION** | **REMARKS**

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

A. BLEEDING RESERVOIRS.

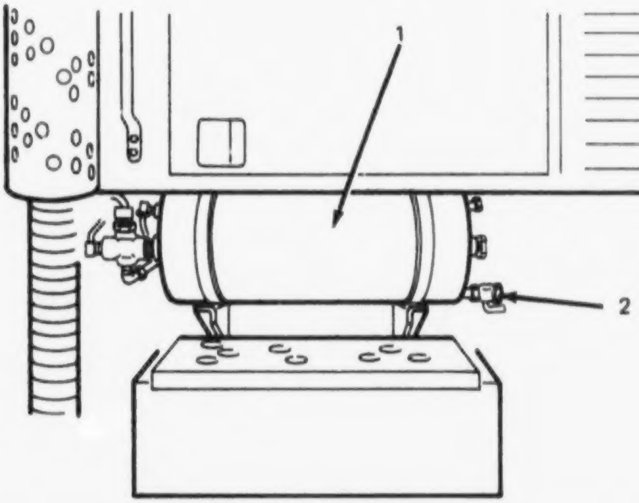
WARNING

Before removing drain valve, bleed the secondary reservoir. There is one on all models located under passenger door.

LOCATION/ITEM	ACTION	REMARKS
1. Drain valve (2).	Turn handle and allow air to exhaust.	

B. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
2. Drain valve (2).	Unscrew and remove from reservoir (1).	



LEGEND:

1. RESERVOIR
2. DRAIN VALVE

TA 074900

COMPRESSED AIR SYSTEM.

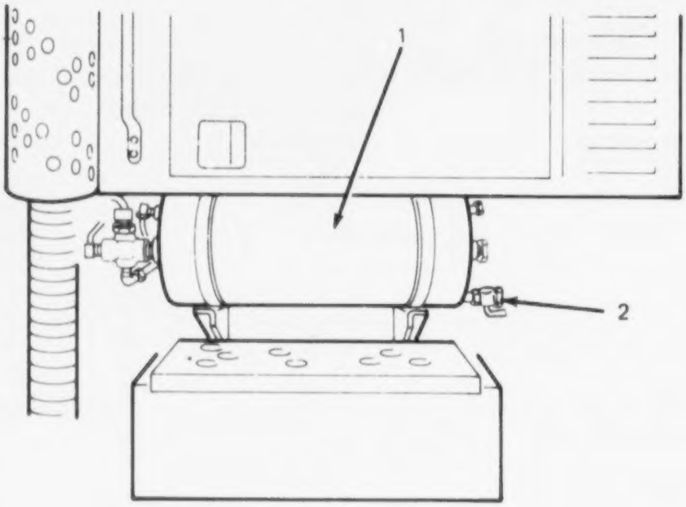
9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
3. Drain valve (2).	a. Coat threads with liquid teflon. b. Screw into reservoir (1) and tighten.	
D. CHECKING FOR LEAKS.		
4. Drain valve (2).	Turn handle to close valve.	Be sure valves are closed on all service reservoirs.
5. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 90-120 psi (621-827 kPa).	
6. Drain valve (2).	Use soap solution to check for leaks.	Tighten as necessary.
7. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-13. SECONDARY RESERVOIR MANUAL DRAIN VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RESERVOIR
2. DRAIN VALVE

TA 074901

9-14. SAFETY RELEASE VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(2)
b.	Testing.	(10)
c.	Installation.	(3)
d.	Operational Check	(5)
		20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap Solution.
Controllable Shop Air Supply.
Air Pressure Gage.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained. (M915 Primary M916 Thru M920-Secondary).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

COMPRESSED AIR SYSTEM.

9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

For location refer to locator illustration (para 9-5 e. thru 9-5 j.).

A. REMOVAL.

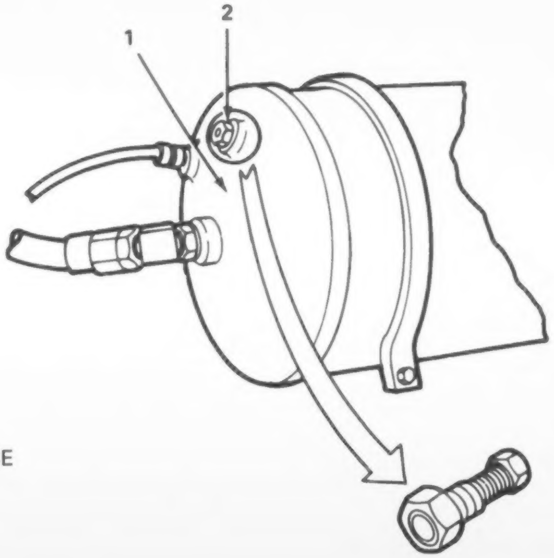
WARNING

Do not remove safety release valve until reservoir pressure is fully exhausted.

LOCATION/ITEM	ACTION	REMARKS
1. Safety release valve (2).	Unscrew and remove from reservoir (1).	

B. TESTING.

LOCATION/ITEM	ACTION	REMARKS
2. Check safety release valve (2).	a. Connect to adjustable pressure supply with pressure gage between valve and supply.	



LEGEND:

1. RESERVOIR
2. SAFETY RELEASE VALVE

TA 074902

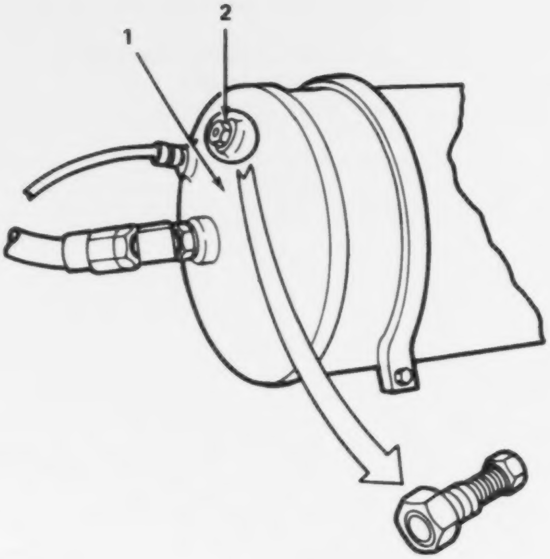
9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. TESTING (Continued).		
	b. Gradually increase pressure. Valve should exhaust air when pressure reaches 145-155 psi (1000-1069 kPa).	If valve does not work properly, replace it.
C. INSTALLATION.		
3. Safety release valve (2).	a. Coat threads with liquid teflon. b. Screw into reservoir (1) and tighten.	
D. OPERATIONAL CHECK.		
4. Engine.	a. Start up (see TM 9-2320-273-10). b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
5. Safety release valve (2).	Use soap solution to check for leaks.	Tighten as necessary.
6. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-14. SAFETY RELEASE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. RESERVOIR
2. SAFETY RELEASE VALVE

TA 074903

COMPRESSED AIR SYSTEM.

9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Testing.	(2)
c. Installation.	(4)
d. Operational Check.	(4)
	14 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Controllable Shop Air Supply.
Air Pressure Gage.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Primary Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.

COMPRESSED AIR SYSTEM.

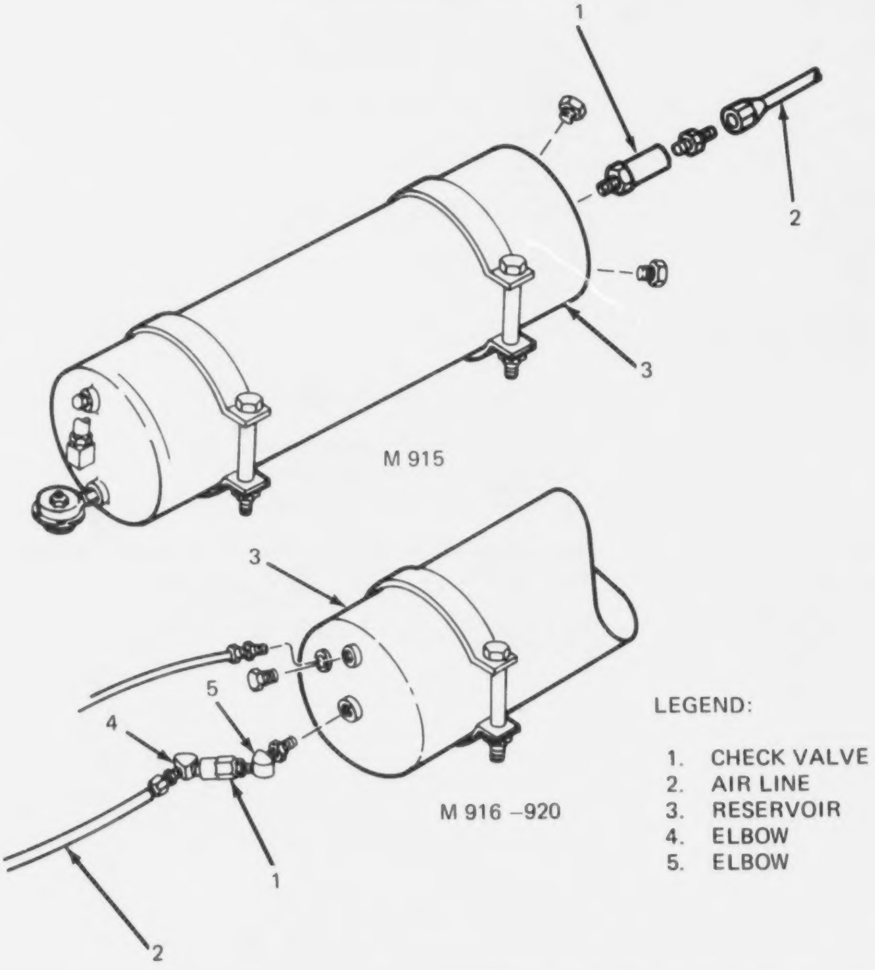
9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).

A. REMOVAL.

WARNING

Do not remove check valve until reservoir pressure is fully exhausted.

LOCATION/ITEM	ACTION	REMARKS
1. Air line (2).	Unscrew and remove.	
2. Elbow (4).	Unscrew and remove.	M916 thru M920.
3. Check valve (1).	Unscrew and remove from reservoir (3) (M915) or from elbow (5) (M916 thru M920).	


1
2
3
M 915
3
5
4
1
2
M 916 –920
LEGEND:
1. CHECK VALVE
2. AIR LINE
3. RESERVOIR
4. ELBOW
5. ELBOW

TA 074904

COMPRESSED AIR SYSTEM.

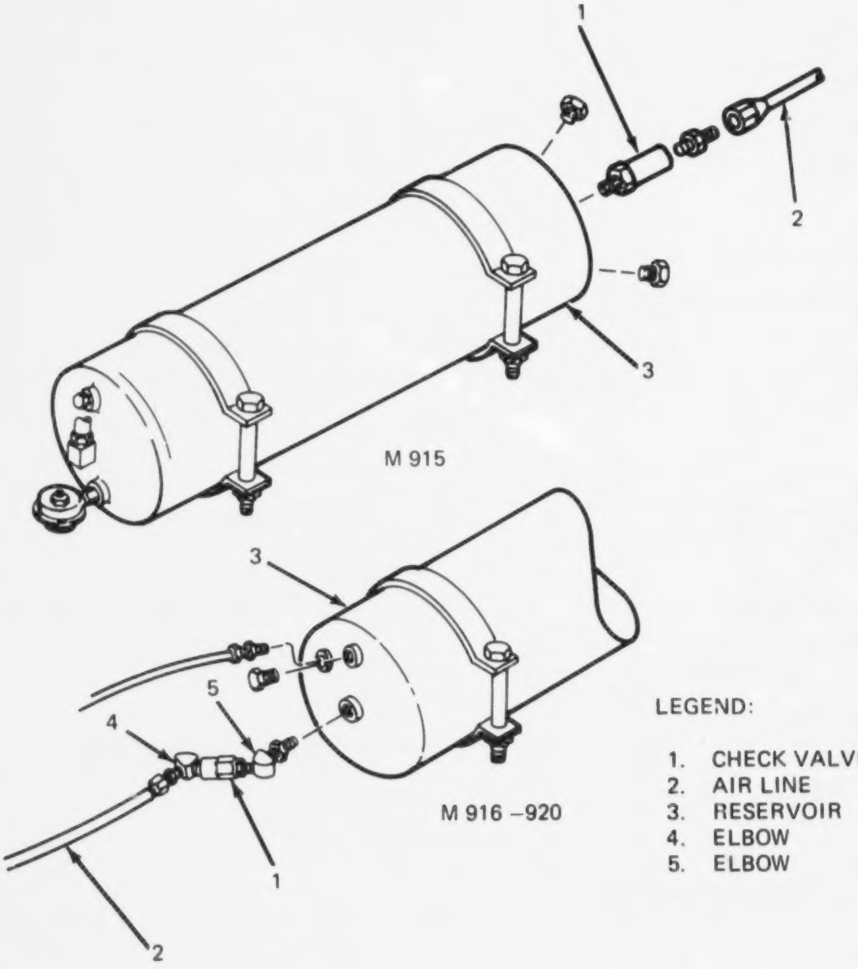
9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. TESTING.		
4. Check valve (1).	a. Connect to adjustable pressure supply with pressure gage between valve and supply.	
	b. Gradually increase pressure. Valve should begin exhausting air when pressure reaches 145-155 psi (1000-1069 kPa).	If valve does not work properly, replace it.
C. INSTALLATION.		
5. Check valve (1).	a. Coat threads with liquid teflon.	
	b. Screw into reservoir (3) and tighten.	M915.
	c. Screw into elbow (5).	M916 thru M920.
6. Elbow (4).	Screw into check valve (1).	M916 thru M920.
7. Air line (2).	Install and tighten.	
D. OPERATIONAL CHECK.		
8. Engine.	a. Start up (see TM 9-2320-273-10).	
	b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
9. Check valve (1).	Use soap solution to check for leaks.	Tighten as necessary.
10. Engine.	Shut down (see TM 9-2320-273-10).	

COMPRESSED AIR SYSTEM.

9-15. SUPPLY RESERVOIR CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
M 915
3
5
4
1
2
M 916 –920

LEGEND:

1. CHECK VALVE
2. AIR LINE
3. RESERVOIR
4. ELBOW
5. ELBOW

TA 074905

COMPRESSED AIR SYSTEM.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(10)
b.	Installation.	(10)
c.	Checking for Leaks.	(5)
		25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap Solution.
Marking Pen.
Masking Tape.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

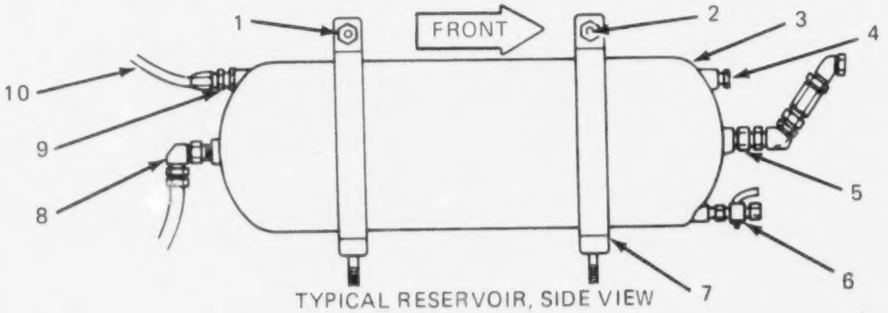
For locations of reservoirs see para 9-5 e. thru 9-5 j. of this manual.

WARNING

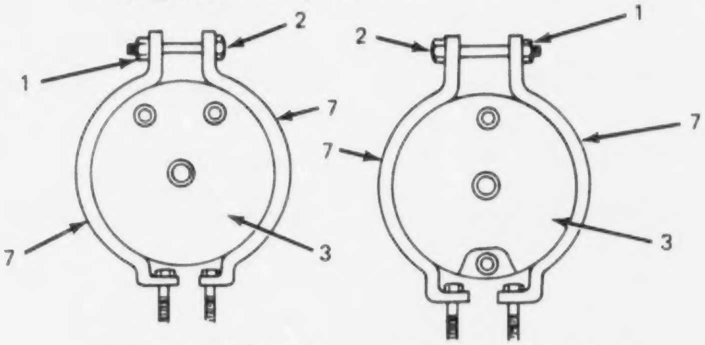
Do not remove any reservoir or air line until pressure is fully exhausted from all supply and service reservoirs.

NOTE

The illustrations below show a typical air reservoir and associated air lines and fittings of the M915 thru M920 truck tractors and chassis. No special instructions or tools are needed if you follow standard shop practice techniques.



TYPICAL RESERVOIR, SIDE VIEW



TYPICAL RESERVOIR REAR VIEW

TYPICAL RESERVOIR FRONT VIEW

TA 074906

LEGEND:

1. NUT (2)
2. BOLT (2)
3. RESERVOIR
4. PLUG(S)
5. REDUCER(S)
6. VALVE(S)
7. STRAP (4)
8. ELBOW(S)
9. CONNECTOR(S)
10. AIR LINE(S)

COMPRESSED AIR SYSTEM.

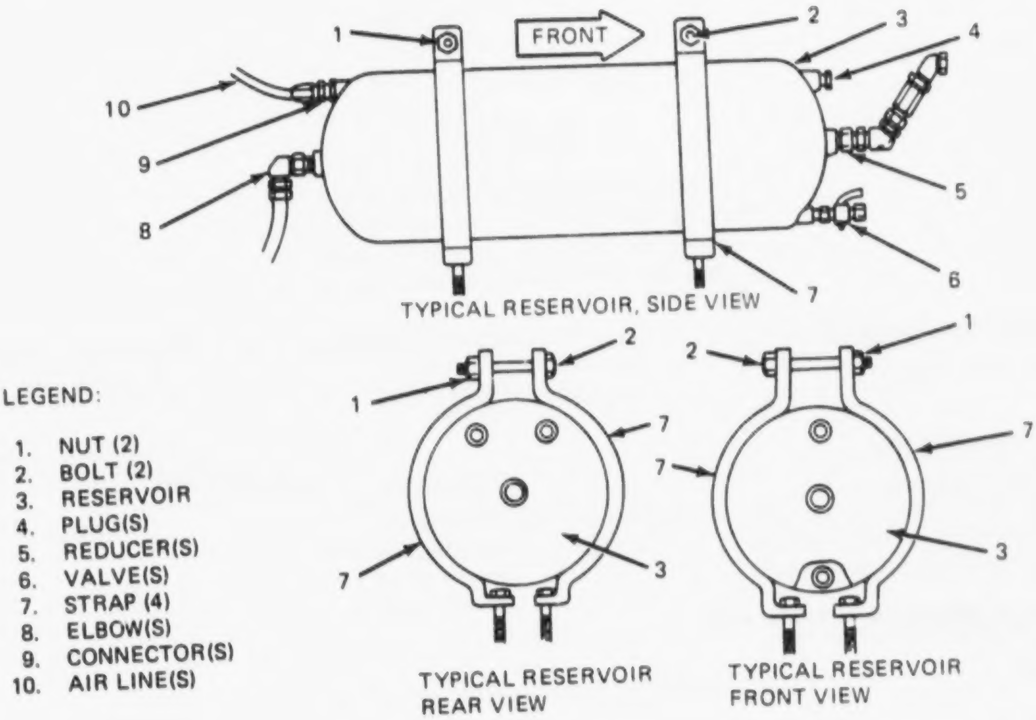
9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
	NOTE As you remove each component, tag for reassembly.	
1. Air line(s) (10).	Disconnect.	
2. Two nuts (1).	Loosen and remove.	
3. Two bolts (2).	Remove.	
4. Reservoir (3).	Slide forward or aft through two sets of straps (7) and remove.	
5. All fittings on reservoir; (plug(s) (4), reducer(s) (5), valve(s) (6), elbow(s) (8), connector(s) (9).	Unscrew and remove.	
B. INSTALLATION.		
	NOTE Check all lines and fittings for leaks, cracks, and damaged threads. Replace, if necessary. Be sure hoses are connected to the proper reservoir or valve ports as you tagged at removal.	
6. Plug(s) (4), reducer(s) (5), valve(s) (6), elbow(s) (8) and connector(s) (9).	Coat threads with liquid teflon and install.	
7. Reservoir (3).	Slide back into place through two sets of straps (7).	
8. Two bolts (2).	Install one through each set of straps (7).	
9. Two nuts (1).	Install and tighten.	
10. Air line(s) (10).	Reconnect.	

COMPRESSED AIR SYSTEM.

9-16. RESERVOIRS AND AIR LINES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMRKS
C. CHECKING FOR LEAKS.		
11. Engine.	a. Start up (see TM 9-2320-273-10).	
	b. Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
	c. Check for leaks using soap solution, then shut down engine.	Retighten as necessary.



TYPICAL RESERVOIR, SIDE VIEW

TYPICAL RESERVOIR REAR VIEW

TYPICAL RESERVOIR FRONT VIEW

LEGEND:

1. NUT (2)
2. BOLT (2)
3. RESERVOIR
4. PLUG(S)
5. REDUCER(S)
6. VALVE(S)
7. STRAP (4)
8. ELBOW(S)
9. CONNECTOR(S)
10. AIR LINE(S)

TA 074907

COMPRESSED AIR SYSTEM

9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(1.0)
b. Inspection and Installation.	(0.4)
c. Operational Check.	(0.3)
	1.7 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape, Antiseizing Item 14, Appendix C.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
TM 9-2320-273-10.	Air System Draincocks Open.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air dryer.	Disconnect damaged hoses (1), lines (2), tubes (3), or fittings (4).	Tag each component for reassembly. Note the routing of the hoses, lines and tubes when removing them.
B. INSPECTION AND INSTALLATION.		
2. Air dryer.	Check all hoses (1), lines (2), tubes (3), or fittings (4) for leaks, cracks and damage.	Replace if necessary.
3.	Install new hoses (1), lines (2), tubes (3) in the same location as the old ones.	

CAUTION

Make sure that all support clamps (5) are used when replacing lines or tubes. Do not let tubing touch any hot surface such as compressor discharge line (6), or oil lines.

LOCATION/ITEM	ACTION	REMARKS
4. Hoses (1), lines (2), tubes (3) or fittings (4).	Apply antiseizing tape on all threads and reconnect as tagged during removal.	
C. OPERATIONAL CHECK.		
5. Air system.	Close draincocks and start engine to charge the air system.	Charge air system until it reaches 120 psi (827.4 kPa) and check for air leaks.

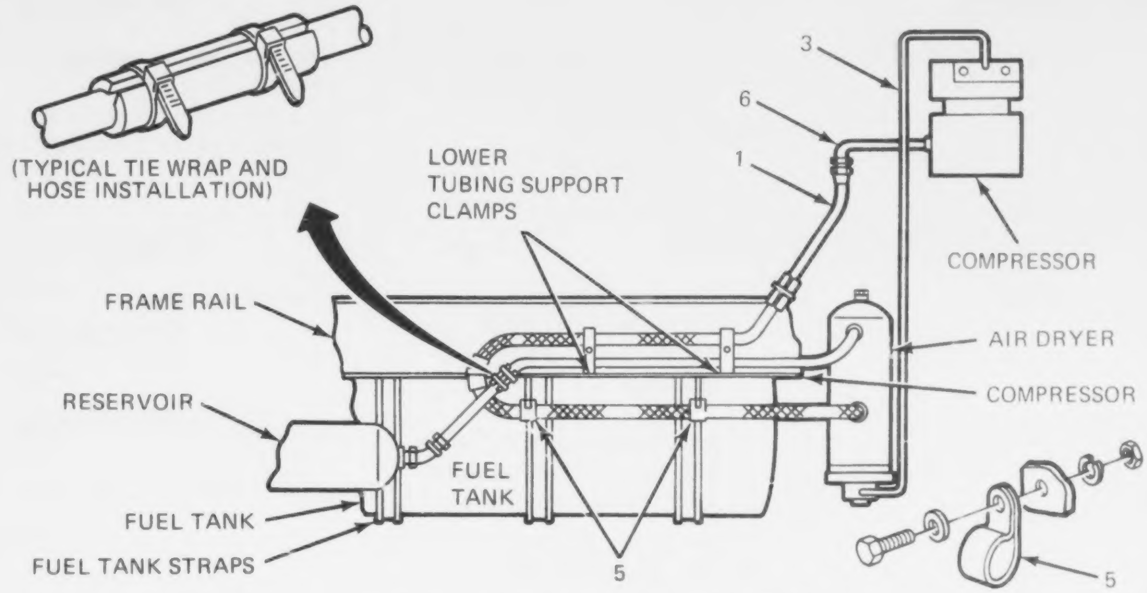
NOTE

No Follow-on maintenance required.

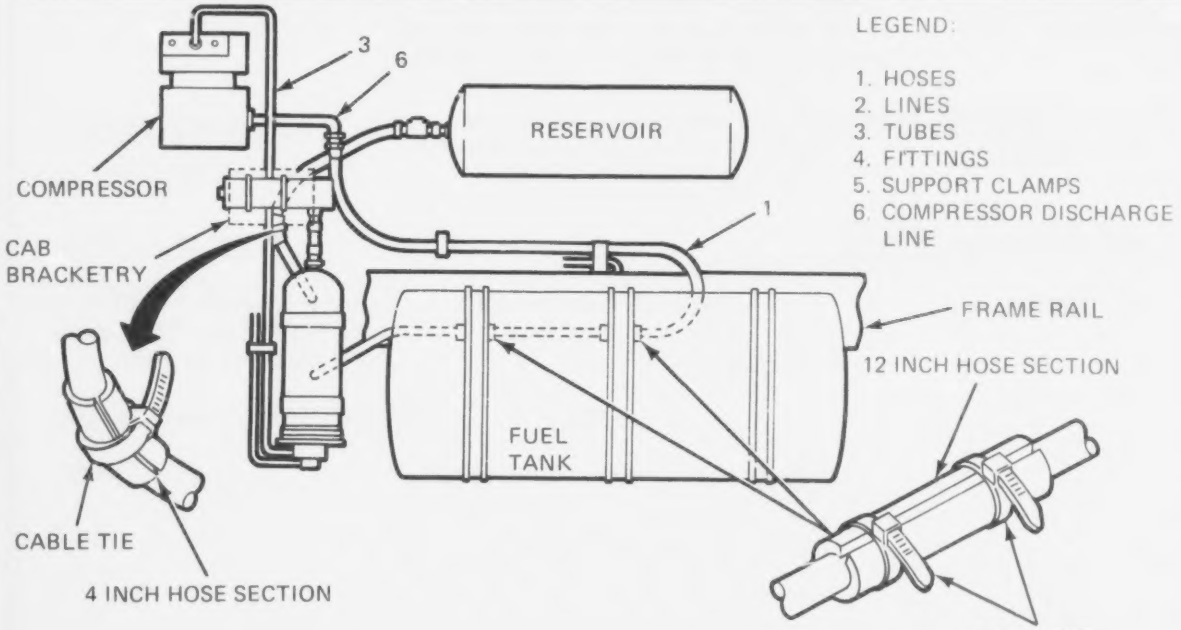
COMPRESSED AIR SYSTEM.

9-16.1. AIR DRYER TUBING AND HOSE REPLACEMENT.

LOCATION/ITEM	ACTION	REMARKS


(TYPICAL TIE WRAP AND HOSE INSTALLATION)
LOWER TUBING SUPPORT CLAMPS
3
6
1
COMPRESSOR
FRAME RAIL
AIR DRYER
RESERVOIR
COMPRESSOR
FUEL TANK
FUEL TANK
FUEL TANK STRAPS
5
5

Tubing and hose installation model M915.


3
6
RESERVOIR
COMPRESSOR
1
CAB BRACKETRY
FRAME RAIL
12 INCH HOSE SECTION
FUEL TANK
CABLE TIE
4 INCH HOSE SECTION
CABLE TIES

LEGEND:

1. HOSES
2. LINES
3. TUBES
4. FITTINGS
5. SUPPORT CLAMPS
6. COMPRESSOR DISCHARGE LINE

Tubing and hose installation models M916 thru M920.

TA 237233

9-17. TRAILER SUPPLY BRAKE VALVE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection of Lines and Fittings.	(5)
c. Installation.	(15)
d. Operational Check.	(15)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen.
Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission in Neutral.

BRAKE SYSTEM.

9-17. TRAILER SUPPLY BRAKE VALVE (Continued).

NOTE

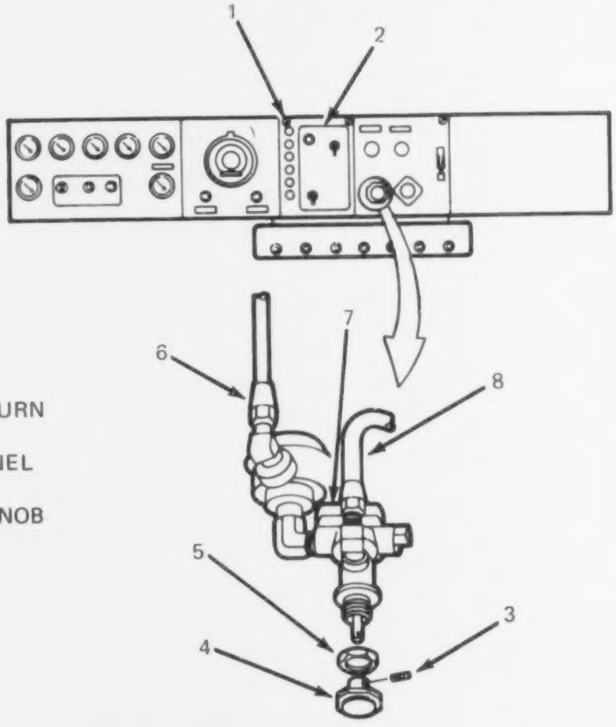
For location, refer to locator illustration para 9-5 e. thru 9-5 j.

WARNING

Disconnect battery before doing any work behind dash panel.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two quarter-turn screws (1).	Loosen.	
2. Hinged panel (2).	Lower.	
3. Roll pin (3).	Push out.	
4. Control Knob (4).	Remove.	
5. Locknut (5).	Unscrew and remove.	



LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED PANEL
3. ROLL PIN
4. CONTROL KNOB
5. LOCKNUT
6. AIR LINE
7. VALVE
8. AIR LINE

TA 074908

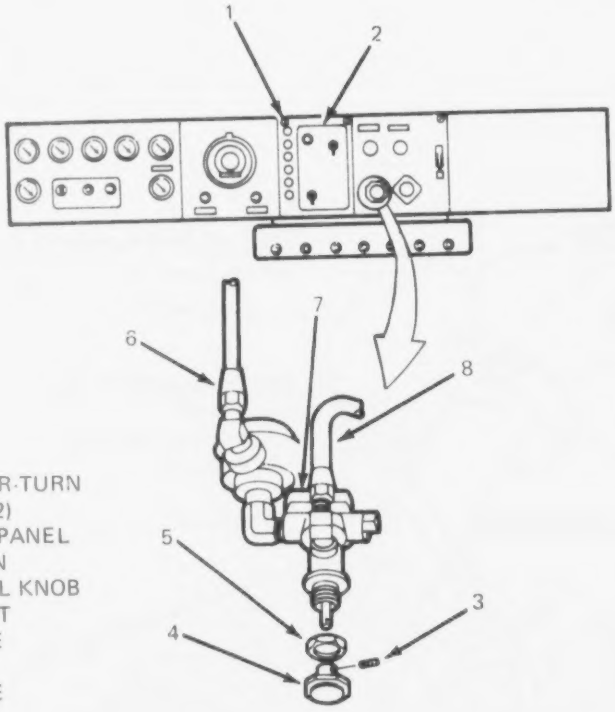
9-17. TRAILER SUPPLY BRAKE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).	**WARNING** Do not remove any air lines until pressure is fully exhausted from all reservoirs.	
6. Air line (6).	a. Label using masking tape and marker pencil. b. Unscrew and remove from valve (7).	
7. Air line (8).	a. Label using masking tape and marker pencil. b. Unscrew and remove from valve (7).	
8. Valve (7).	Remove from dash panel.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (6) and (8).	Inspect for: a. Cracks. b. Leaks. c. Kinks. d. Damaged threads.	Replace, if necessary.
C. INSTALLATION.		
10. Valve (7).	Install behind dash panel.	
11. Two air lines (6) and (8).	a. Coat threads on valve (7) with liquid teflon. b. Screw into valve (7) and tighten.	
12. Locknut (5).	Screw into valve (7) and tighten.	
13. Control knob (4).	Install by alining hole in knob with hole in valve handle.	
14. Roll pin (3).	Push in.	
15. Hinged panel (2).	Raise into position.	
16. Two quarter-turn screws (1).	Tighten.	
D. OPERATIONAL CHECK.		
17. Engine.	Start up (see TM 9-2320-273-10). Allow pressure to reach 105-120 psi (724-827 kPa).	

9-17. TRAILER SUPPLY BRAKE VALVE (Continued).

D. OPERATIONAL CHECK (Continued).

LOCATION/ITEM	ACTION	REMARKS
18. Control knob (4).	Push in.	2nd mechanic.
19. CAB/Park brake control and brake pedal.	a. Apply and release parking brakes. b. Press and release brake pedal.	2nd mechanic.
20. Trailer brakes.	Check that brakes apply when: a. Park brake is applied. b. Brake pedal is pressed. c. Trailer emergency brake knob is pulled out.	1st mechanic.
21. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. QUARTER-TURN SCREW (2)
2. HINGED PANEL
3. ROLL PIN
4. CONTROL KNOB
5. LOCKNUT
6. AIR LINE
7. VALVE
8. AIR LINE

TA 074909

9-18. TRAILER HAND BRAKE VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Inspection of Air Lines and Fittings.	(5)
c.	Installation.	(10)
d.	Operational Check.	(15)
		35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
M915, M916, M917, M920.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Masking Tape.
Marking Pen.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES
Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

BRAKE SYSTEM.

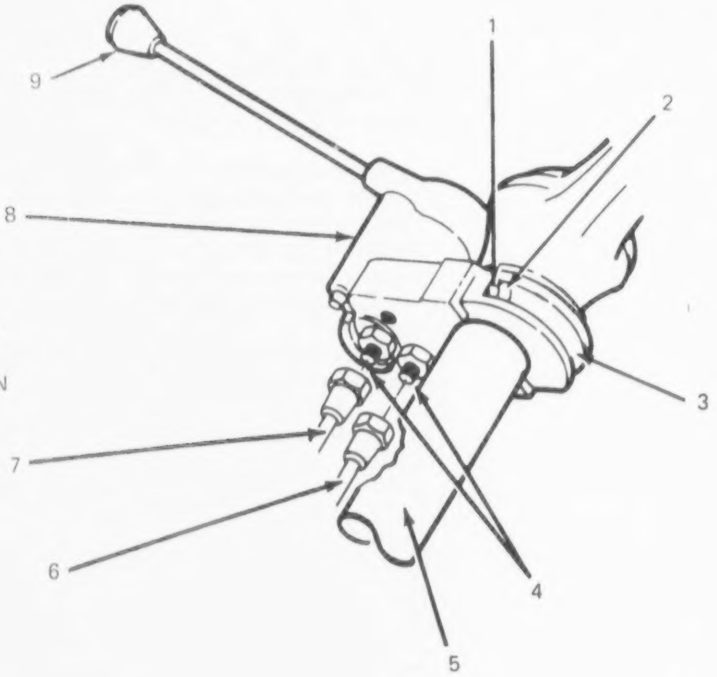
9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Air supply line (6) and air delivery line (7).	a. Use tape and marker pencil to label lines. b. Unscrew from adapters (4) and remove.	
2. Two capscrews (2) and lockwashers (1).	Unscrew and remove.	
3. Valve (8) and retaining strap (3).	Remove.	
4. Two adapters (4).	Unscrew and remove from valve (8).	
5. Knob (9).	Remove by twisting and pulling.	Knob is not threaded.



LEGEND:

1. LOCKWASHER (2)
2. CAPSCREW (2)
3. RETAINING STRAP
4. ADAPTER (2)
5. STEERING COLUMN
6. AIR SUPPLY LINE
7. AIR DELIVERY LINE
8. VALVE
9. KNOB

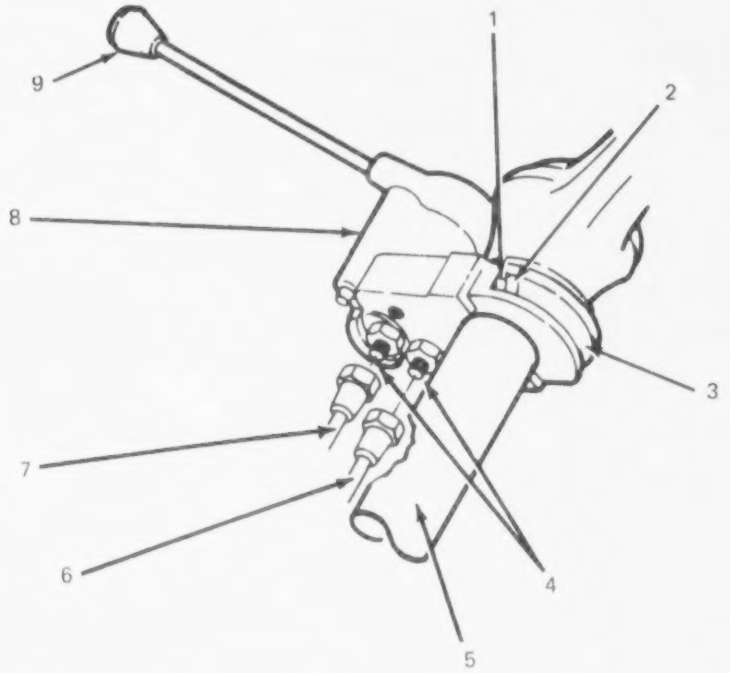
TA 074910

9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF AIR LINES AND FITTINGS.		
6. Air supply line (6), air delivery line (7), two adapters (4), and valve (8).	Inspect for: a. Cracks. b. Leaks. c. Damaged threads.	Replace as necessary.
C. INSTALLATION.		
7. Knob (9).	Push onto valve handle.	
8. Two adapters (4).	Screw into valve (8).	
9. Valve (8).	Position on steering column (5).	
10. Two capscrews (2) and lockwashers (1).	Screw in and tighten to secure retaining strap (3) to valve (8).	
11. Air supply line (6) and air delivery line (7).	Screw air lines onto adapters (4) and tighten.	Be sure to attach each line to the correct fitting as you marked.
D. OPERATIONAL CHECK.		
12. Engine.	Start up (See TM 9-2320-273-10). Allow pressure to reach 105-120 psi (724-827 kPa).	
13. Knob (9).	a. Pull down slowly.	1st mechanic.
	b. Check for leaks at air supply line (6) and air delivery line (7).	1st mechanic.
	c. Check for air pressure at gladhand connection or trailer.	2nd mechanic.
	d. Return handle to normal position.	1st mechanic.
14. Engine.	Shut down (see TM 9-2320-273-10).	

9-18. TRAILER HAND BRAKE VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. LOCKWASHER (2)
2. CAPSCREW (2)
3. RETAINING STRAP
4. ADAPTER (2)
5. STEERING COLUMN
6. AIR SUPPLY LINE
7. AIR DELIVERY LINE
8. VALVE
9. KNOB

TA 074911

BRAKE SYSTEM.

9-19. PARKING BRAKE VALVE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection of Lines and Fittings.	(5)
c. Installation.	(20)
d. Operational Check.	(15)
	55 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Masking Tape.
Marking Pen.
Soap and Water Solution.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

BRAKE SYSTEM.

9-19. PARKING BRAKE VALVE (Continued).

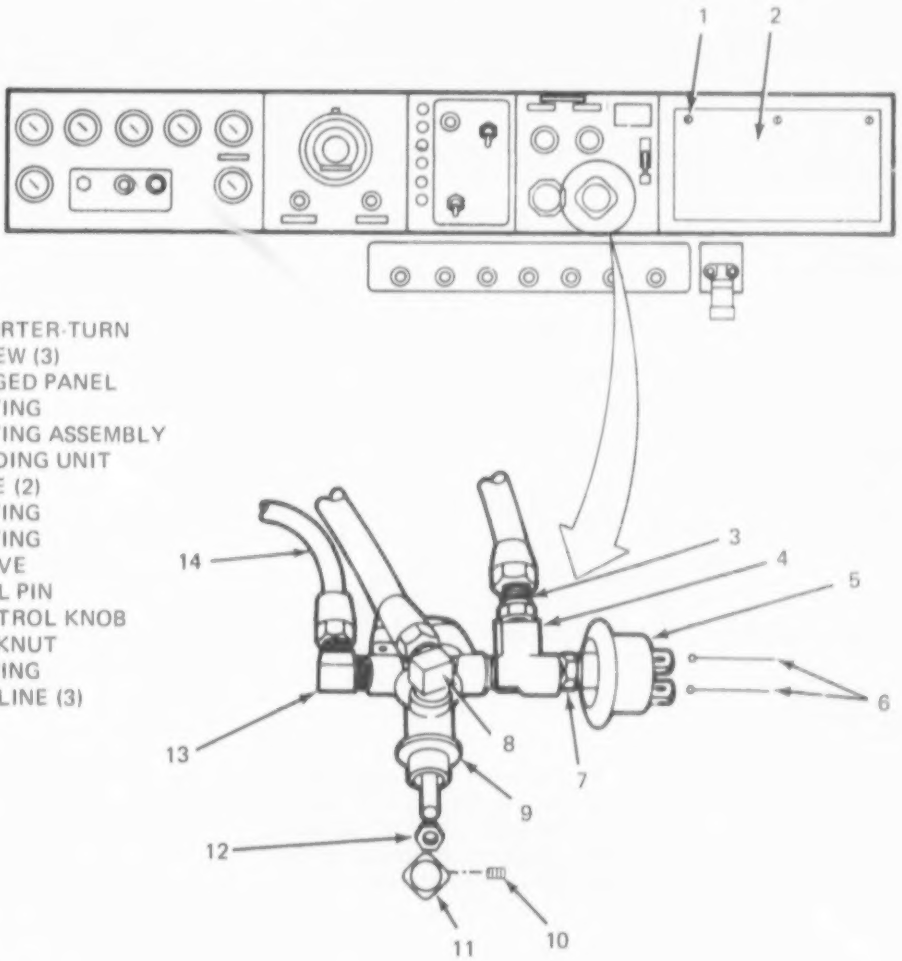
LOCATION/ITEM	ACTION	REMARKS

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

WARNING

Disconnect battery before doing any work behind dash panel.



LEGEND:

1. QUARTER-TURN SCREW (3)
2. HINGED PANEL
3. FITTING
4. FITTING ASSEMBLY
5. SENDING UNIT
6. WIRE (2)
7. FITTING
8. FITTING
9. VALVE
10. ROLL PIN
11. CONTROL KNOB
12. LOCKNUT
13. FITTING
14. AIR LINE (3)

TA 074912

BRAKE SYSTEM.

9-19. PARKING BRAKE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three quarter-turn screws (1).	Loosen.	
2. Hinged panel (2).	Lower.	
3. Roll pin (10).	Push out.	
4. Control knob (11).	Remove.	
5. Locknut (12).	Unscrew and remove.	
6. Two wires (6).	Mark and disconnect from sending unit (5).	
	WARNING Do not remove any air lines until pressure is fully exhausted from all reservoirs.	
7. Three air lines (14)	a. Label using masking tape and marker pencil. b. Unscrew and remove.	
8. Valve (9).	Remove from dash panel.	
B. INSPECTION OF LINES AND FITTINGS.		
9. Air lines (14).	Inspect for: a. Cracks. b. Leaks. c. Kinks. d. Damaged threads.	Replace if necessary.
C. INSTALLATION.		
10. Fittings.	Lay new valve beside old valve and remove fittings (13), (8) and assembly (4) from old valve, coat threads with liquid teflon and install in new valve.	

9-19. PARKING BRAKE VALVE (Continued).

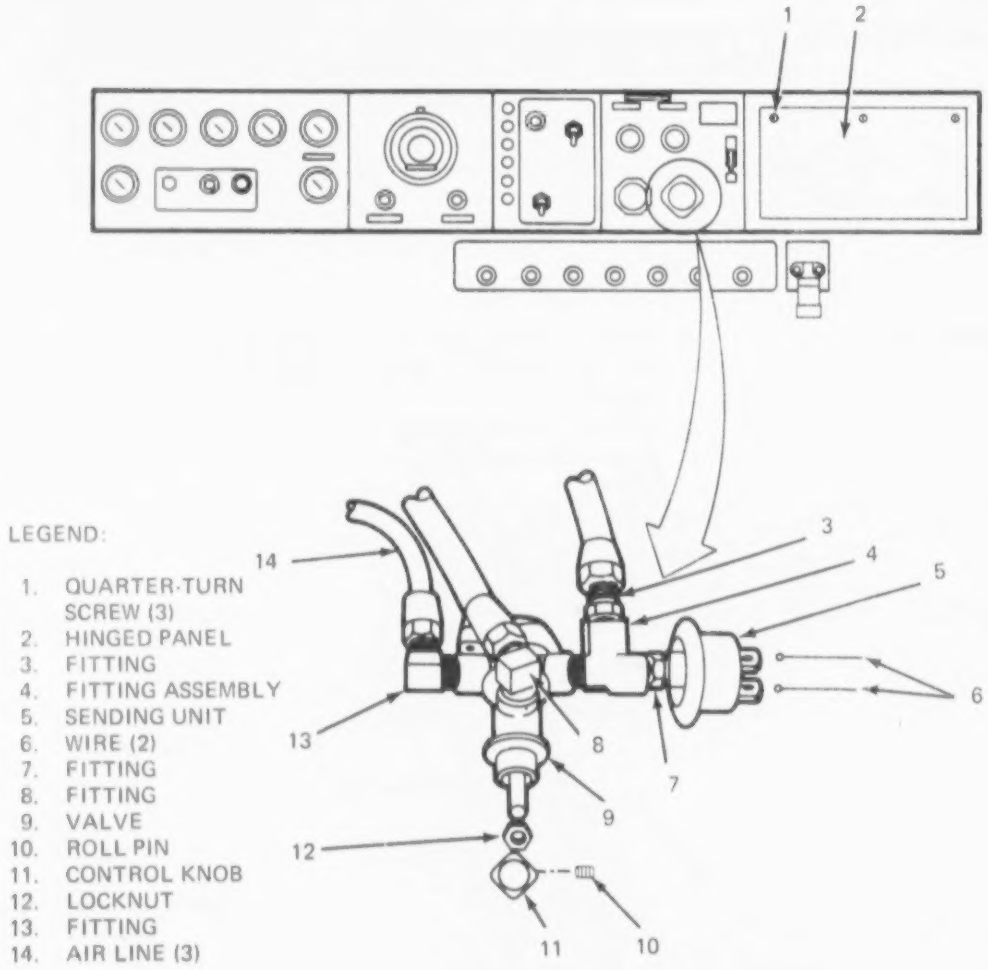
LOCATION/ITEM	ACTION	REMARKS

C. INSTALLATION (Continued).

NOTE

Install fittings to same angle as removed.

11. Valve (9).	Install behind dash panel.	
12. Three air lines (14).	Screw onto valve (9) and tighten.	



LEGEND:

1. QUARTER-TURN SCREW (3)
2. HINGED PANEL
3. FITTING
4. FITTING ASSEMBLY
5. SENDING UNIT
6. WIRE (2)
7. FITTING
8. FITTING
9. VALVE
10. ROLL PIN
11. CONTROL KNOB
12. LOCKNUT
13. FITTING
14. AIR LINE (3)

TA 074913

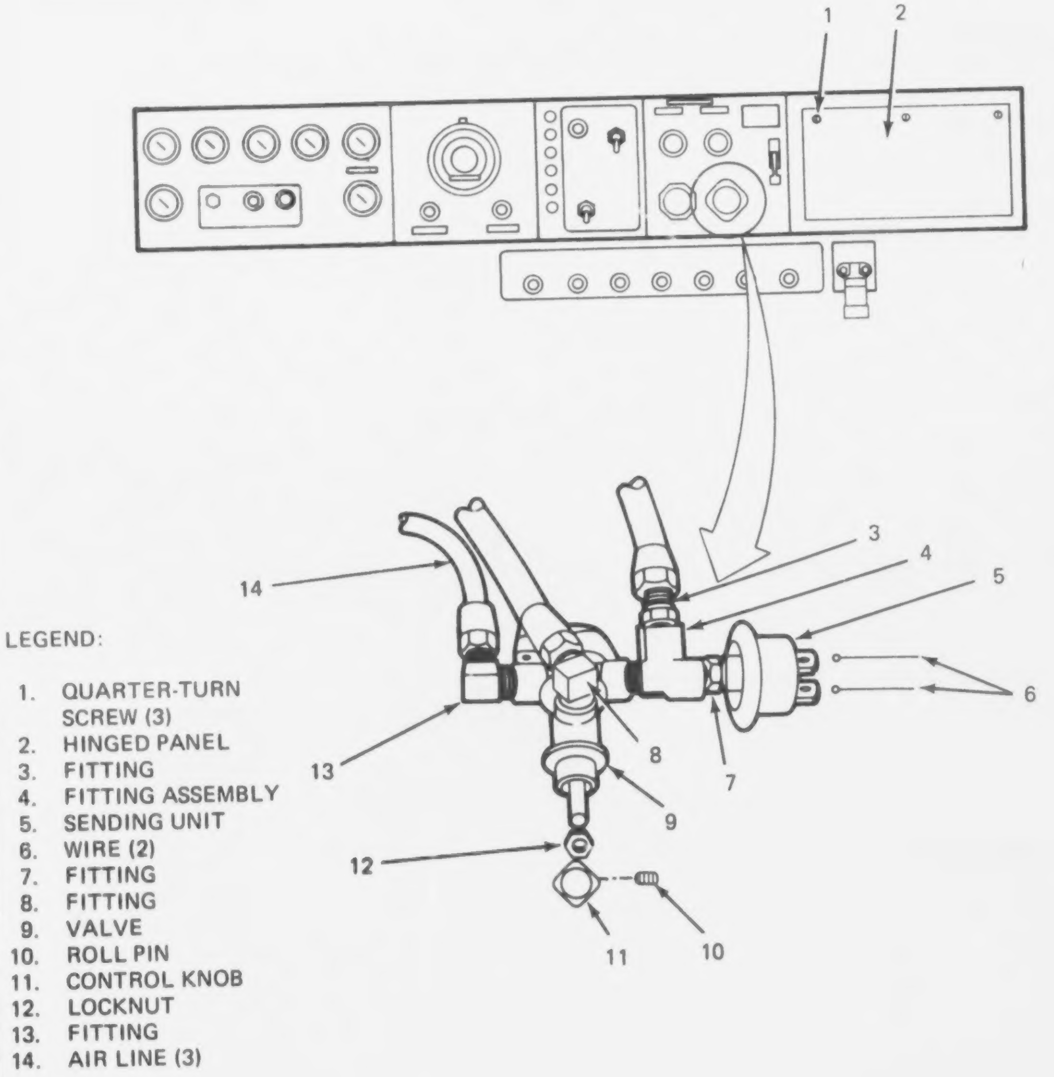
BRAKE SYSTEM.

9-19. PARKING BRAKE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
13. Two wires (6).	Fasten to sending unit (5).	
14. Locknut (12).	Screw onto valve (9) and tighten.	
15. Control knob (11).	Install by alining hole in knob with hole in valve handle.	
16. Roll pin (10).	Push in.	
17. Hinged panel (2)	Raise into position.	
18. Three quarter-turn screws (1).	Tighten.	
D. OPERATIONAL CHECK.		
19. Engine	Start up (see TM 9-2320-273-10).	
20. Control knob (11).	a. When valve is pushed in, parking brakes should be released. b. When valve is pulled out, parking brakes should apply. c. Apply soapy solution to the fittings and check for bubbles. If bubbles appear, tighten fittings.	Brakes will not release until system reaches 65 psi.
21. Engine.	Shut down (see TM 9-2320-273-10).	

9-19. PARKING BRAKE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (3)
2. HINGED PANEL
3. FITTING
4. FITTING ASSEMBLY
5. SENDING UNIT
6. WIRE (2)
7. FITTING
8. FITTING
9. VALVE
10. ROLL PIN
11. CONTROL KNOB
12. LOCKNUT
13. FITTING
14. AIR LINE (3)

TA 074914

9-20. AIR PRESSURE GAGES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(10)
b.	Installation.	(10)
c.	Operational Check.	(10)
		30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission in Neutral.

BRAKE SYSTEM.

9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).

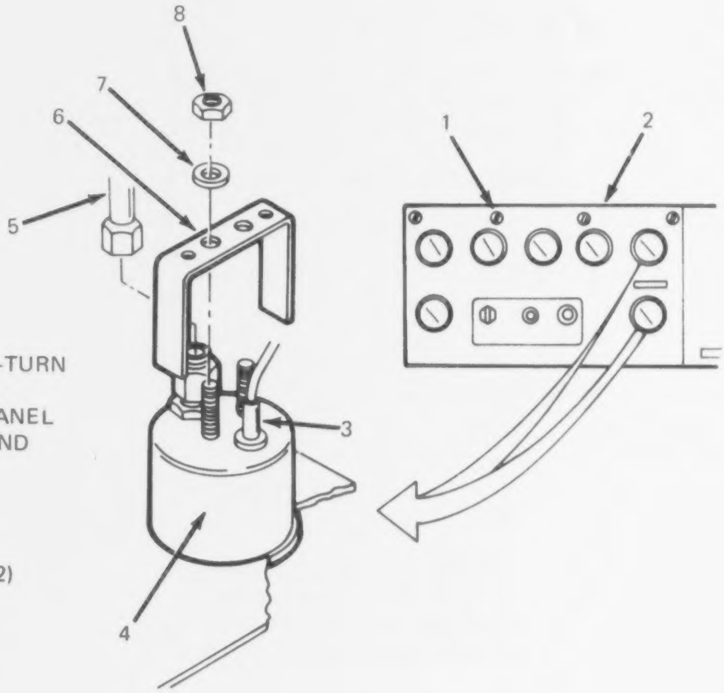
LOCATION/ITEM **ACTION** **REMARKS**

NOTE

The procedure below may be used to replace either of the two air gages on the left-hand instrument panel.

A. REMOVAL .

LOCATION/ITEM	ACTION	REMARKS
1. Four quarter-turn screws (1).	Loosen. Lower hinged panel (2).	
2. Air line (5).	a. Unscrew and remove. b. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace, if necessary.



LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED PANEL
3. SOCKET AND BULB
4. GAGE
5. AIR LINE
6. BRACKET
7. WASHER (2)
8. NUT (2)

TA 074915

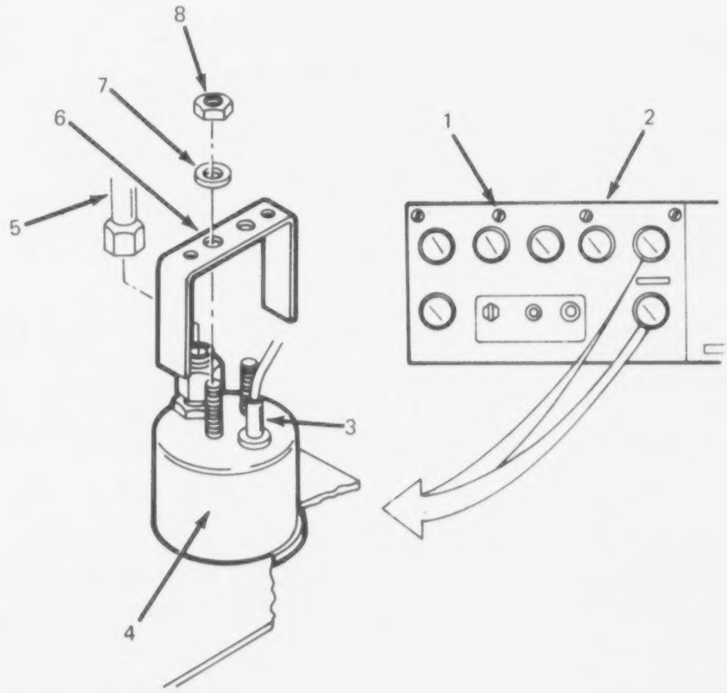
BRAKE SYSTEM.

9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Socket and bulb (3).	Remove by pulling on socket.	
4. Two nuts (8) and washers (7).	Remove.	
5. Bracket (6).	Remove.	
6. Gage (4).	Remove gage.	
	NOTE If you are pulling rear air gage do the same as above.	
B. INSTALLATION.		
7. Gage (4).	Place in panel (2) with studs pushed through bracket (6).	If a new gage is being installed, transfer all components and use liquid teflon on threads.
8. Two nuts (8) and washers (7).	Install and tighten.	
9. Socket and bulb (3).	Press in until socket is flush with gage (4).	
10. Air line (5).	Screw into gage (4).	
11. Hinged panel (2).	Close. Tighten four quarter-turn screws (1).	
	NOTE If you removed rear air gage do the same as above.	
C. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10).	
13. Gage (4).	Observe that pressure build up is registered on gage and that both front and rear show approximately the same pressure.	
14. Engine.	Shut down (see TM 9-2320-273-10).	

9-20. AIR PRESSURE GAGES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (4)
2. HINGED PANEL
3. SOCKET AND BULB
4. GAGE
5. AIR LINE
6. BRACKET
7. WASHER (2)
8. NUT (2)

TA 074916

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Pedal Removal.	(5)
b. Valve Removal.	(20)
c. Valve Installation.	(20)
d. Pedal Installation.	(10)
e. Operational Check.	(2)
	57 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.
Masking Tape.
Marking Pen.
Cotter Pin, 210490 (06853).
Cotter Pin, 210492 (06853).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
9-27A and 9-28A.	Double Check Valve Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

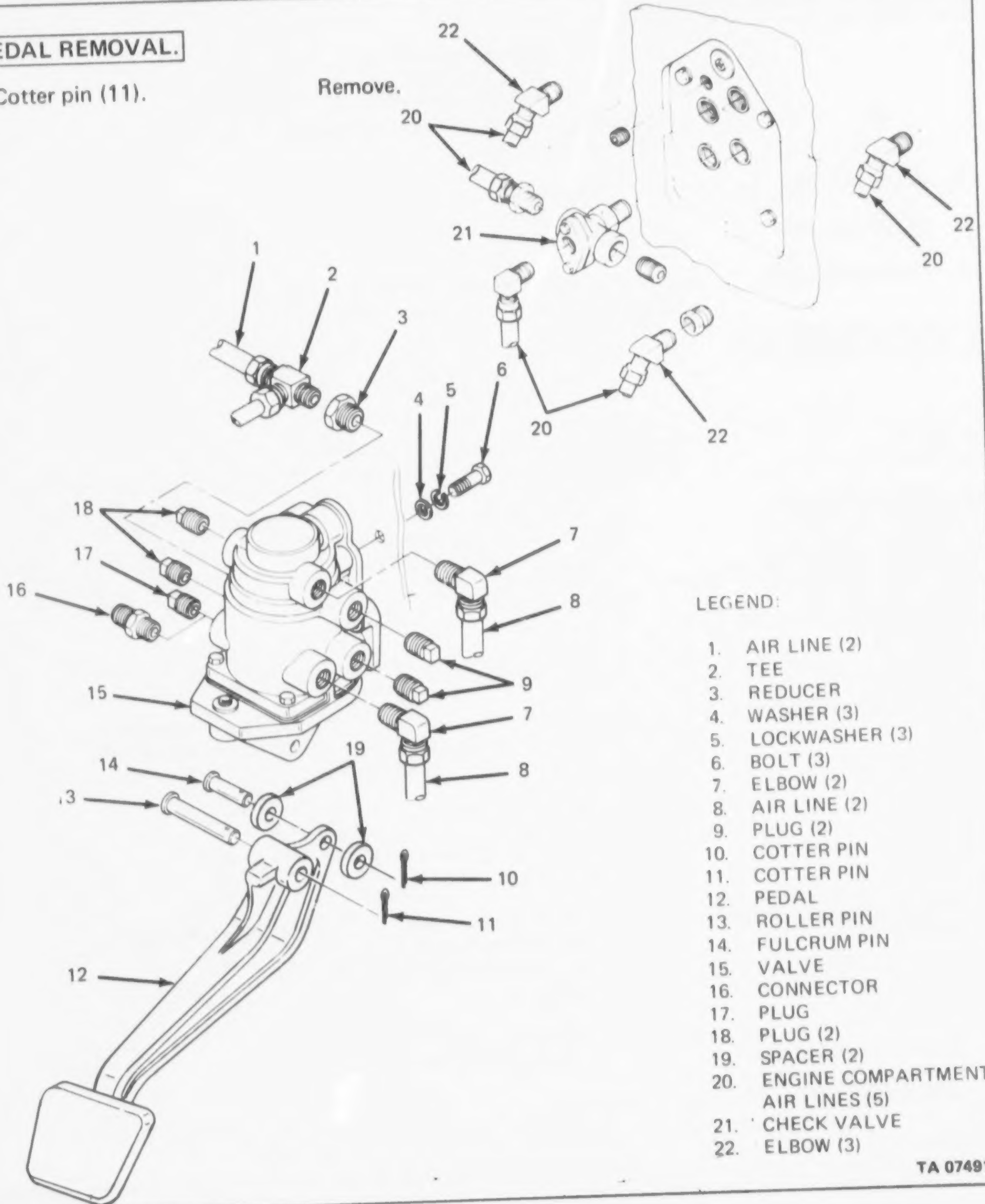
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Park Brake Set.
Transmission in Neutral.

BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. PEDAL REMOVAL.		
1. Cotter pin (11).	Remove.	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LEGEND:

1. AIR LINE (2)
2. TEE
3. REDUCER
4. WASHER (3)
5. LOCKWASHER (3)
6. BOLT (3)
7. ELBOW (2)
8. AIR LINE (2)
9. PLUG (2)
10. COTTER PIN
11. COTTER PIN
12. PEDAL
13. ROLLER PIN
14. FULCRUM PIN
15. VALVE
16. CONNECTOR
17. PLUG
18. PLUG (2)
19. SPACER (2)
20. ENGINE COMPARTMENT AIR LINES (5)
21. CHECK VALVE
22. ELBOW (3)

TA 074917

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

A. PEDAL REMOVAL (Continued).

CAUTION

When brake pedal is removed, piston will drop from brake valve.

LOCATION/ITEM	ACTION	REMARKS
2. Roller pin (13).	Remove.	
3. Cotter pin (10).	Remove.	
4. Fulcrum pin (14).	Push out and remove pedal (12), along with two spacers (19).	

B. VALVE REMOVAL.

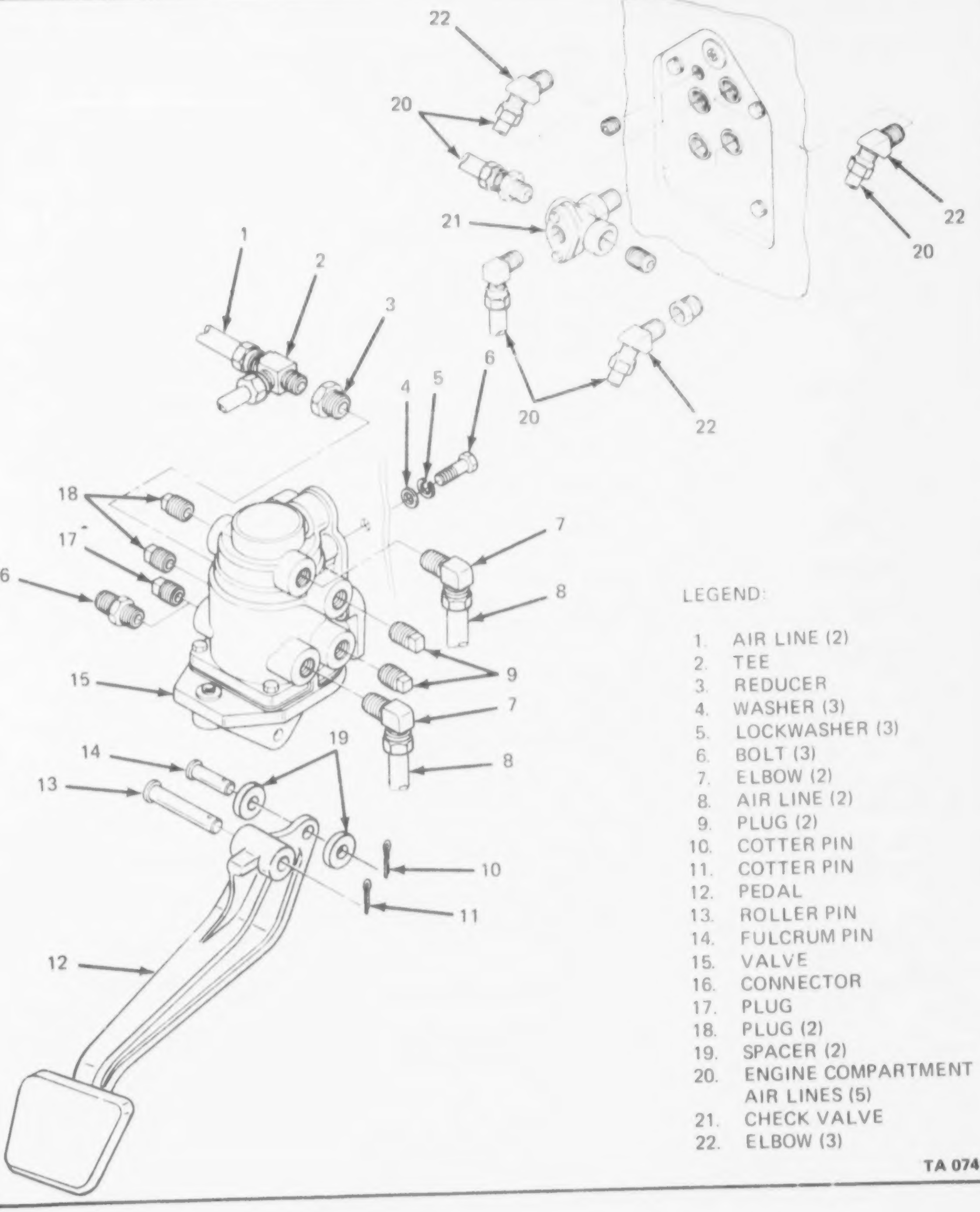
WARNING

Do not remove brake valve until pressure is fully exhausted from all reservoirs.

LOCATION/ITEM	ACTION	REMARKS
5. Two air lines (8).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary.
6. Two air lines (1).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary. M918 and M919 only.
7. Five engine compartment air lines (20).	a. Unscrew and remove. b. Tape and mark each line as an aid when installing line. c. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged fittings.	Replace if necessary.
8. Check valve (21).	Remove.	

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. AIR LINE (2)
2. TEE
3. REDUCER
4. WASHER (3)
5. LOCKWASHER (3)
6. BOLT (3)
7. ELBOW (2)
8. AIR LINE (2)
9. PLUG (2)
10. COTTER PIN
11. COTTER PIN
12. PEDAL
13. ROLLER PIN
14. FULCRUM PIN
15. VALVE
16. CONNECTOR
17. PLUG
18. PLUG (2)
19. SPACER (2)
20. ENGINE COMPARTMENT AIR LINES (5)
21. CHECK VALVE
22. ELBOW (3)

TA 074918

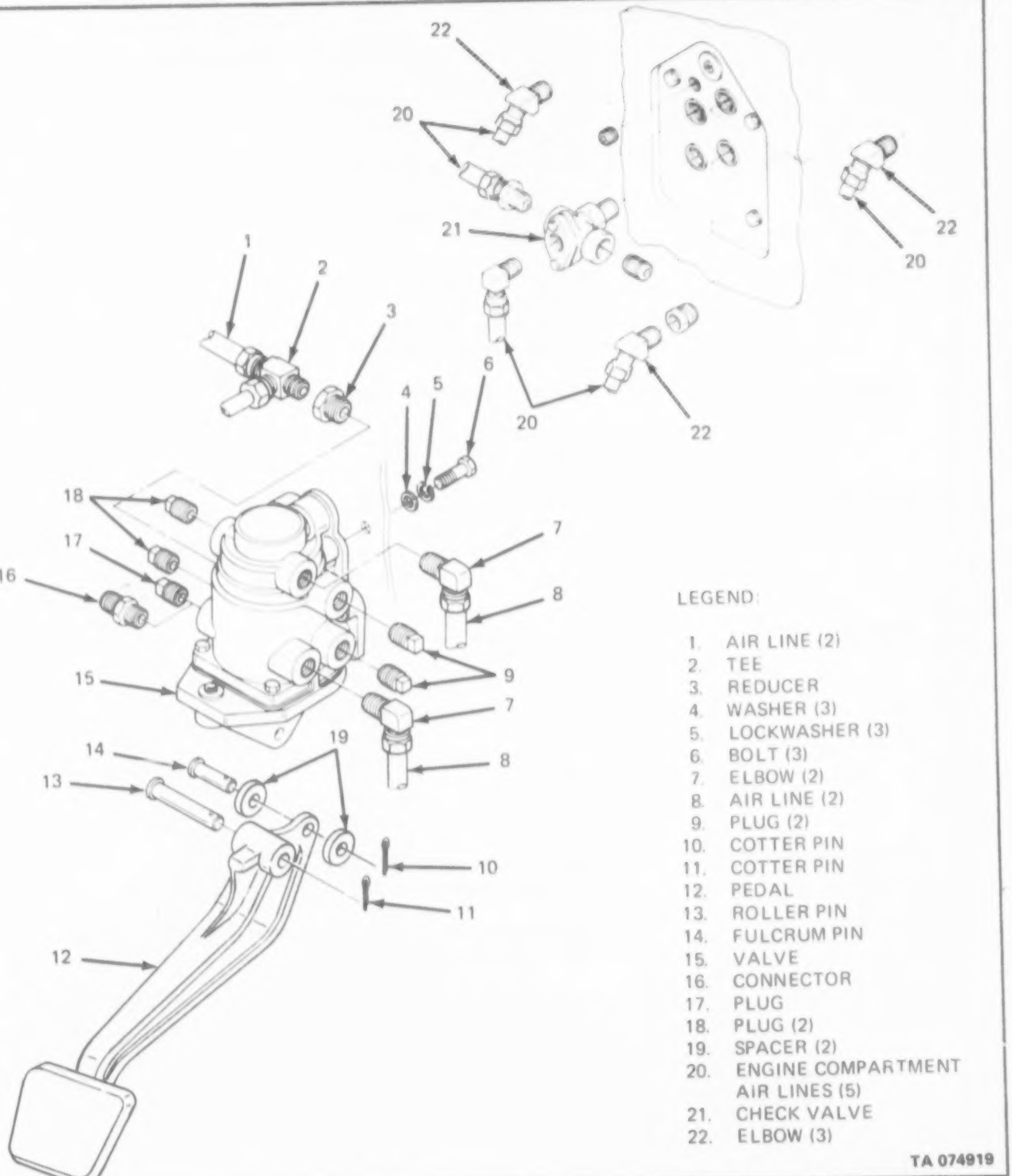
BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. VALVE REMOVAL (Continued).		
9. Three elbows (22).	a. Unscrew and remove. b. Tape and mark each fitting as an aid when installing.	
10. Three bolts (6), lockwashers (5) and washers (4).	a. Unscrew and remove. b. Remove valve (15).	
11. Two elbows (7).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
12. Two plugs (9).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
13. Connector (16).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	M916 thru M920.
14. Plug (17).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	M915 only.
15. Two plugs (18).	a. Unscrew and remove. b. Tape and mark as an aid when installing.	
16. Reducer (3).	a. Unscrew and remove with tee (2) attached. b. Tape and mark as an aid when installing.	M918 and M919 only.
C. VALVE INSTALLATION.		
17. Reducer (3) with tee (2) attached.	a. Coat threads with liquid teflon. b. Install, noting position of tee and reducer when removed.	M918 and M919 only.
18. Two plugs (18).	a. Coat threads with liquid teflon. b. Install, noting positions of plugs when removed.	

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. AIR LINE (2)
2. TEE
3. REDUCER
4. WASHER (3)
5. LOCKWASHER (3)
6. BOLT (3)
7. ELBOW (2)
8. AIR LINE (2)
9. PLUG (2)
10. COTTER PIN
11. COTTER PIN
12. PEDAL
13. ROLLER PIN
14. FULCRUM PIN
15. VALVE
16. CONNECTOR
17. PLUG
18. PLUG (2)
19. SPACER (2)
20. ENGINE COMPARTMENT AIR LINES (5)
21. CHECK VALVE
22. ELBOW (3)

TA 074919

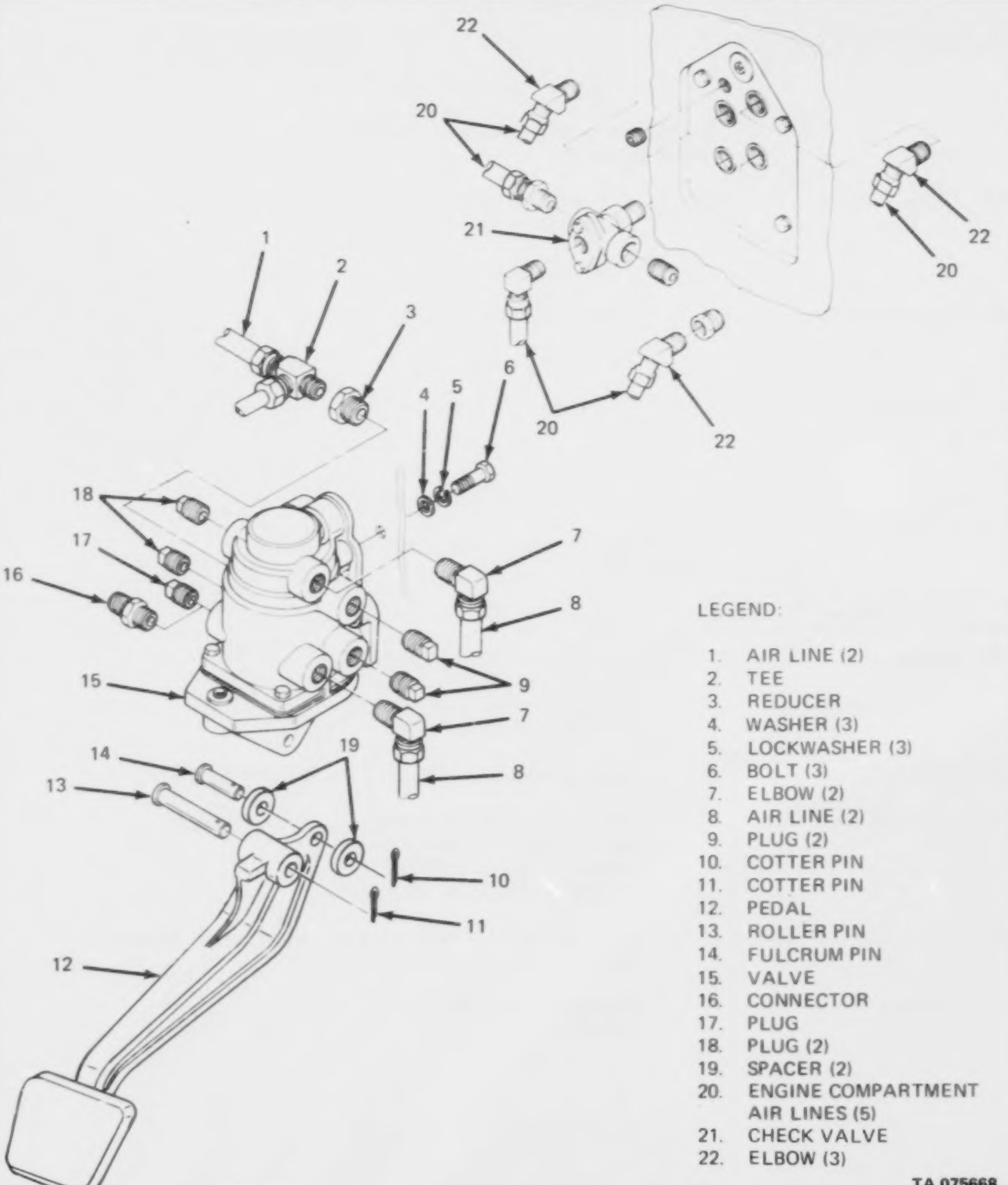
BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. VALVE INSTALLATION (Continued).		
19. Plug (17).	a. Coat threads with liquid teflon. b. Install, noting position of plug when removed.	M915 only.
20. Connector (16).	a. Coat threads with liquid teflon. b. Install, noting position of connector when removed.	M916 thru M920.
21. Two plugs (9).	a. Coat threads with liquid teflon. b. Install, noting position of plugs when removed.	
22. Two elbows (7).	a. Coat threads with liquid teflon. b. Install, noting position of elbows when removed.	
23. Valve (15).	a. Aline with mounting holes on firewall in cab. b. Install with three bolts (6), lockwashers (5), and washers (4).	
24. Three elbows (22).	a. Coat threads with liquid teflon. b. Install, noting position of elbows when removed.	
25. Check valve (21).	a. Coat threads with liquid teflon. b. Install, noting position of check valve when removed.	
26. Five engine compartment air lines (20).	Install, noting positions of air lines when removed.	
27. Two air lines (1).	Install, noting positions of air lines when removed.	M918 and M919 only.
28. Two air lines (8).	Install, noting positions of air lines when removed.	

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. AIR LINE (2)
2. TEE
3. REDUCER
4. WASHER (3)
5. LOCKWASHER (3)
6. BOLT (3)
7. ELBOW (2)
8. AIR LINE (2)
9. PLUG (2)
10. COTTER PIN
11. COTTER PIN
12. PEDAL
13. ROLLER PIN
14. FULCRUM PIN
15. VALVE
16. CONNECTOR
17. PLUG
18. PLUG (2)
19. SPACER (2)
20. ENGINE COMPARTMENT AIR LINES (5)
21. CHECK VALVE
22. ELBOW (3)

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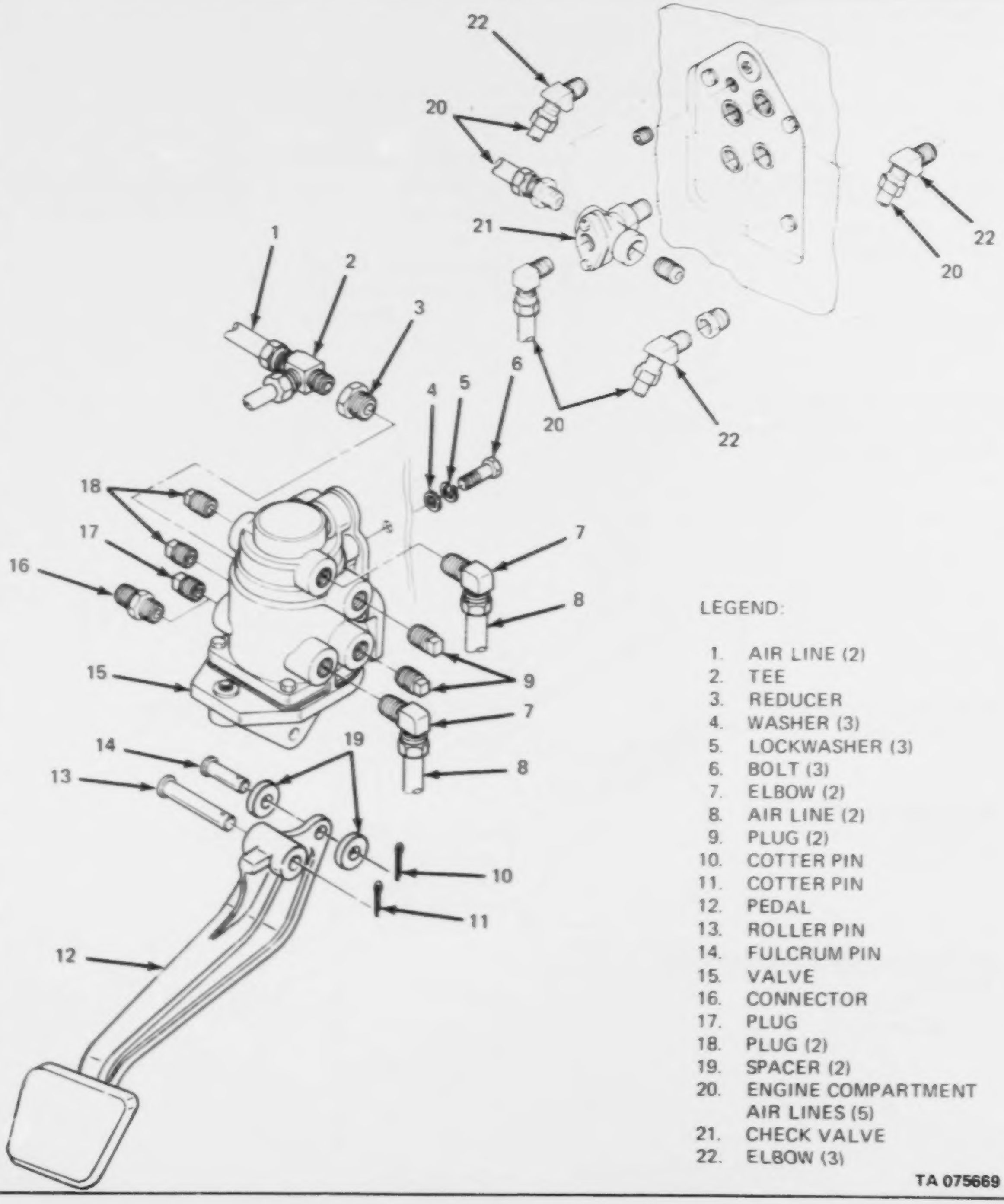
BRAKE SYSTEM.

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. PEDAL INSTALLATION.		
	NOTE Install piston into brake valve before installing pedal.	
29. Pedal (12).	a. Aline with mounting holes on valve (15). b. Install fulcrum pin (14) and two spacers (19).	
30. Cotter pin (10).	Install thru fulcrum pin (14).	
31. Roller pin (13).	Install thru pedal (12).	
32. Cotter pin (11).	Install thru roller pin (13).	
	NOTE Follow on maintenance action required: Install double check valve; refer to para 9-27B and 9-28B.	
E. OPERATIONAL CHECK.		
33. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
34. Pedal (12).	Press down, then release.	Second mechanic.
35. All brakes.	Check to see that all brakes are actuated when pedal is pressed, and that they are released when pedal is released.	First mechanic.
36. Valves (15) and (21).	Use soap solution to check for leaks.	Retighten as necessary.
37. Engine.	Shut down (see TM 9-2320-273-10).	

9-21. BRAKE PEDAL AND VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. AIR LINE (2)
2. TEE
3. REDUCER
4. WASHER (3)
5. LOCKWASHER (3)
6. BOLT (3)
7. ELBOW (2)
8. AIR LINE (2)
9. PLUG (2)
10. COTTER PIN
11. COTTER PIN
12. PEDAL
13. ROLLER PIN
14. FULCRUM PIN
15. VALVE
16. CONNECTOR
17. PLUG
18. PLUG (2)
19. SPACER (2)
20. ENGINE COMPARTMENT AIR LINES (5)
21. CHECK VALVE
22. ELBOW (3)

TA 075669

9-22. SERVICE BRAKES QUICK RELEASE VALVE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Installation.	(10)
c.	Operational Check.	(10)
		25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M918 – 2 Valves Total.
M917, M919, M920 – 3 Valves Total.
1 each Axle.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued).

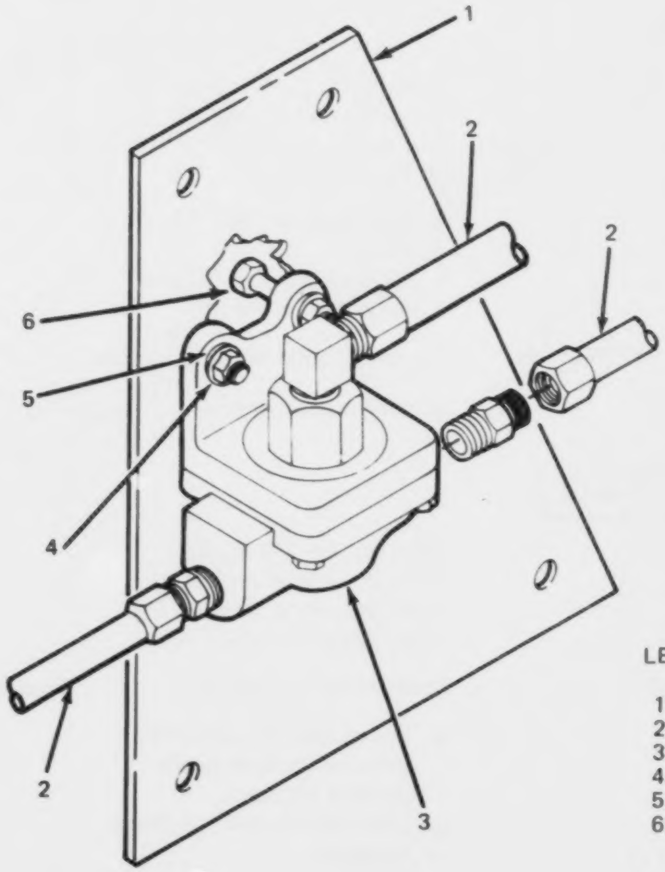
LOCATION/ITEM	ACTION	REMARKS

NOTE

For location, refer to locator illustration (para 9-5 e thru 9-5 j).

WARNING

Do not remove quick-release valve until pressure is fully exhausted from all reservoirs.



LEGEND:

1. BRACKET
2. AIR LINE (3)
3. VALVE
4. NUT (2)
5. WASHER (2)
6. BOLT (2)

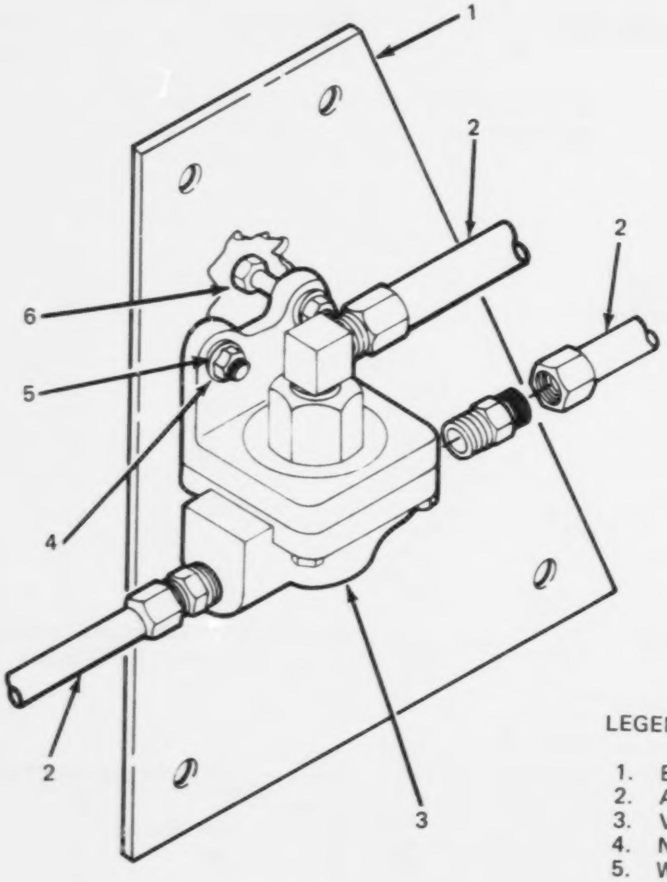
TA 074920

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Three air lines (2).	a. Unscrew and remove. b. Inspect for: 1. Leaks. 2. Cracks. 3. Damaged threads.	 Replace if necessary.
2. Two bolts (6), washers (5), and nuts (4).	Unscrew and remove.	
3. Valve (3).	Remove from bracket (1).	
B. INSTALLATION.		
4. Valve (3).	Transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threaded joints.	
5. Valve (3).	a. Coat threads with liquid teflon. b. Set onto bracket (7) and install two bolts (6).	
6. Two washers (5) and nuts (4).	Install on bolts (6) and tighten.	
7. Three air lines (2).	Screw on and tighten.	
C. OPERATIONAL CHECK.		
8. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
9. CAB/Brake pedal.	Press down and release.	Second mechanic.
10. Valve (3).	a. Check that air exhausts from valve when brake pedal is released. b. Use soap solution to check for leaks.	
11. Engine.	Shut down (see TM 9-2320-273-10).	

9-22. SERVICE BRAKES QUICK RELEASE VALVE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BRACKET
2. AIR LINE (3)
3. VALVE
4. NUT (2)
5. WASHER (2)
6. BOLT (2)

TA 074921

BRAKE SYSTEM.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Installation.	(5)
c.	Operational Check.	(2)
		12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Drain Primary Air Reservoirs.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES
Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).

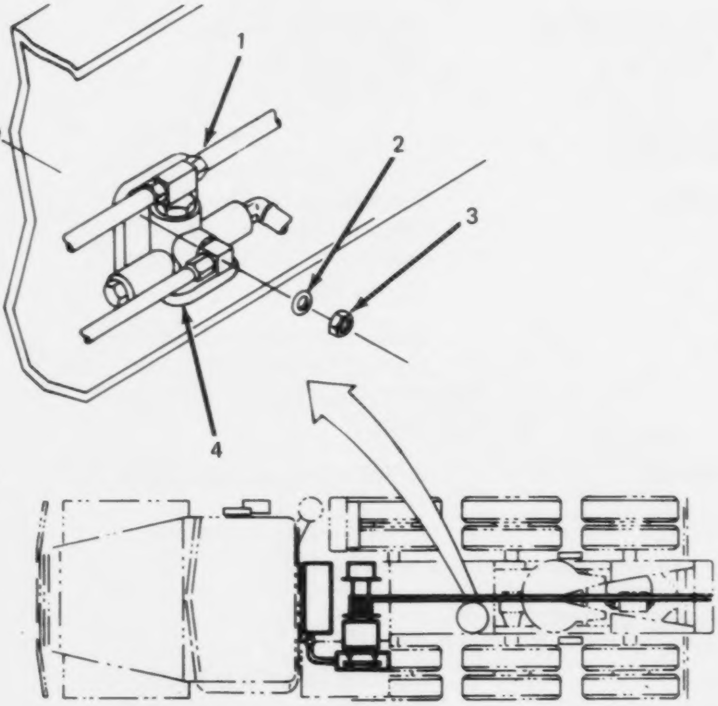
LOCATION/ITEM	ACTION	REMARKS

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

WARNING

Do not remove quick-release/double-check valve until pressure is fully exhausted from all reservoirs.



LEGEND:

1. AIR LINE (FOUR ON M915; FIVE ON M916 THRU M920)
2. WASHER (2)
3. NUT (2)
4. VALVE
5. BOLT (2)

TA 074922

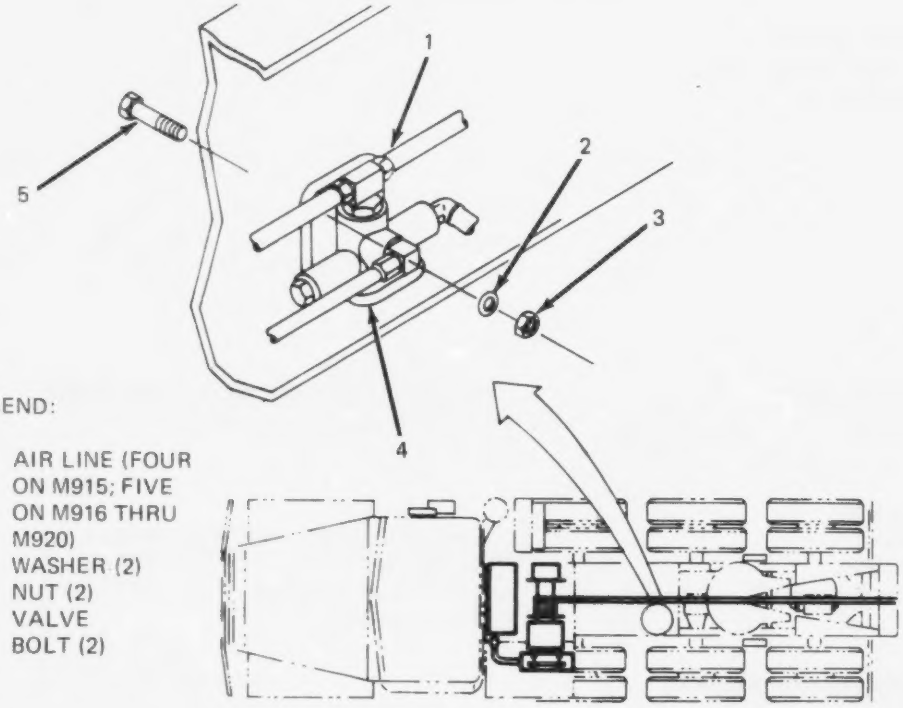
9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
	NOTE On the M915, the valve is located forward of the fifth wheel on the right frame rail. On the M916 thru M920 it is on the left frame rail.	
A. REMOVAL.		
1. Four air lines (1). (M916 thru M920 have five air lines.)	a. Unscrew and remove.	Tag lines for ease of installation.
	b. Inspect for: 1. Cracks. 2. Damaged fittings.	Replace, if necessary.
2. Two nuts (3), washers (2), and bolts (5).	Unscrew and remove. Remove valve (4).	
B. INSTALLATION.		
3. New valve (4).	Transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threads.	
4. Valve (4).	Attach to frame rail with two nuts (3), washers (2), and bolts (5). Tighten nuts and bolts.	
5. Four air lines (1).	a. Coat fittings with liquid teflon. b. Screw on and tighten.	
C. OPERATIONAL CHECK.		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
7. CAB/Brake pedal.	Press and release.	Second mechanic.

9-23. QUICK RELEASE/DOUBLE-CHECK VALVE MAINTENANCE (Continued).

C. OPERATIONAL CHECK (Continued).

LOCATION/ITEM	ACTION	REMARKS
8. Valve (4).	a. Check to see that air exhausts from valve when brakes are released. b. Use soap solution to check for leaks.	First mechanic.
9. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. AIR LINE (FOUR ON M915; FIVE ON M916 THRU M920)
2. WASHER (2)
3. NUT (2)
4. VALVE
5. BOLT (2)

TA 074923

9-24. RELAY VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(20)
c. Checking for Leaks.	(10)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

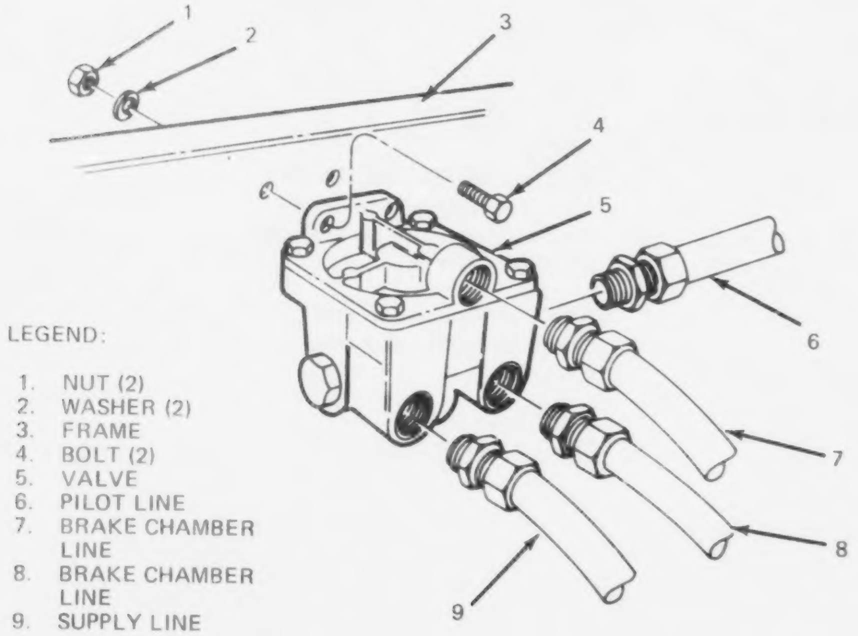
9-24. RELAY VALVE MAINTENANCE (Continued).

WARNING

Do not remove relay valve until pressure is fully exhausted from all reservoirs.

A. REMOVAL .

LOCATION/ITEM	ACTION	REMARKS
1. Pilot line (6), two brake chamber lines (7) and (8), and supply line (9).	a. Unscrew and remove.	
	b. Inspect for: 1. Cracks. 2. Damaged fittings.	Replace if necessary.



LEGEND:

1. NUT (2)
2. WASHER (2)
3. FRAME
4. BOLT (2)
5. VALVE
6. PILOT LINE
7. BRAKE CHAMBER LINE
8. BRAKE CHAMBER LINE
9. SUPPLY LINE

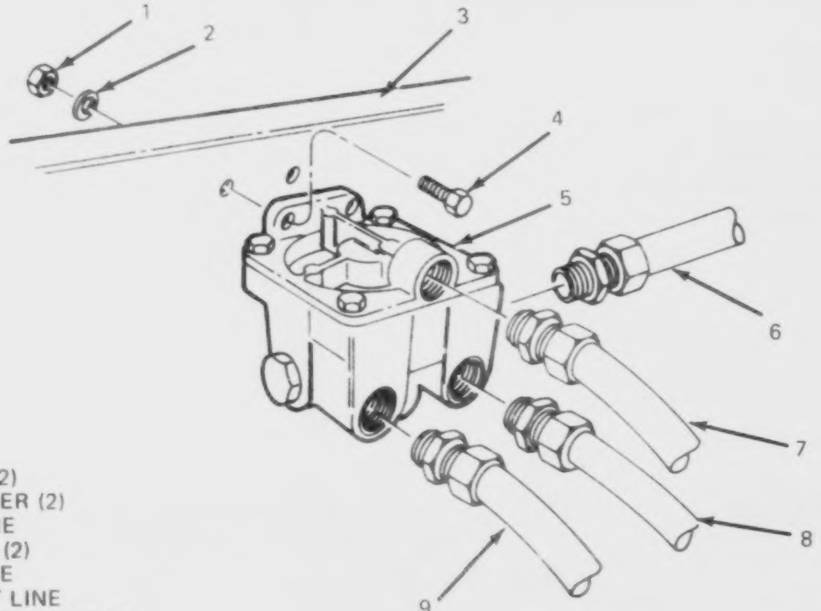
TA 074924

9-24. RELAY VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Two nuts (1), washers (2), and bolts (4).	a. Unscrew and remove. b. Remove valve (5).	
B. INSTALLATION.		
3. Valve (5).	Transfer all components (elbows, adapters, etc.) to new valve before installation. Use liquid teflon on joints.	
4. Valve (5), two nuts (1), washers (2), and bolts (4).	a. Position against frame crossmember (3). b. Tighten nuts.	
5. Pilot line (6), two brake chamber lines (7) and (8), and supply line (9).	a. Coat threads with liquid teflon. b. Screw into valve (5) and tighten.	
C. CHECKING FOR LEAKS .		
6. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
7. Valve (5).	Apply service brakes and check for leaks using soap solution.	
8. Engine.	Shut down (see TM 9-2320-273-10).	

9-24. RELAY VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. NUT (2)
2. WASHER (2)
3. FRAME
4. BOLT (2)
5. VALVE
6. PILOT LINE
7. BRAKE CHAMBER LINE
8. BRAKE CHAMBER LINE
9. SUPPLY LINE

TA 074925

9-25. LIMITING VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(5)
b.	Installation.	(10)
c.	Operational Check.	(5)
		20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-25. LIMITING VALVE MAINTENANCE (Continued).

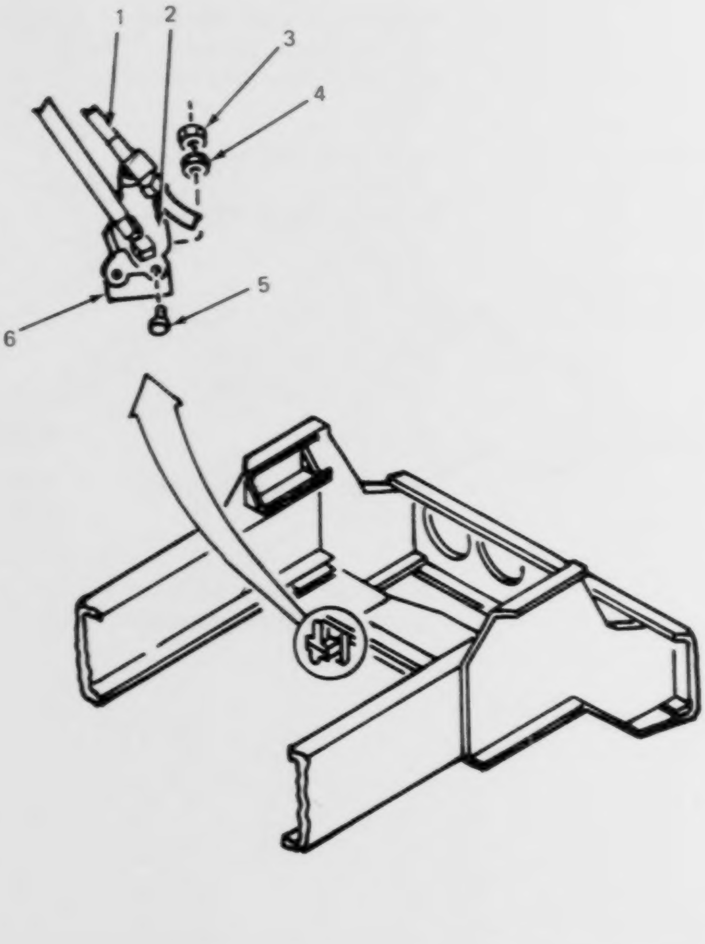
LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not remove limiting valve until pressure is fully exhausted from all reservoirs.

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).



LEGEND:

1. AIR LINE (3)
2. VALVE
3. NUT (2)
4. WASHER (2)
5. CAPSCREW (2)
6. BRACKET

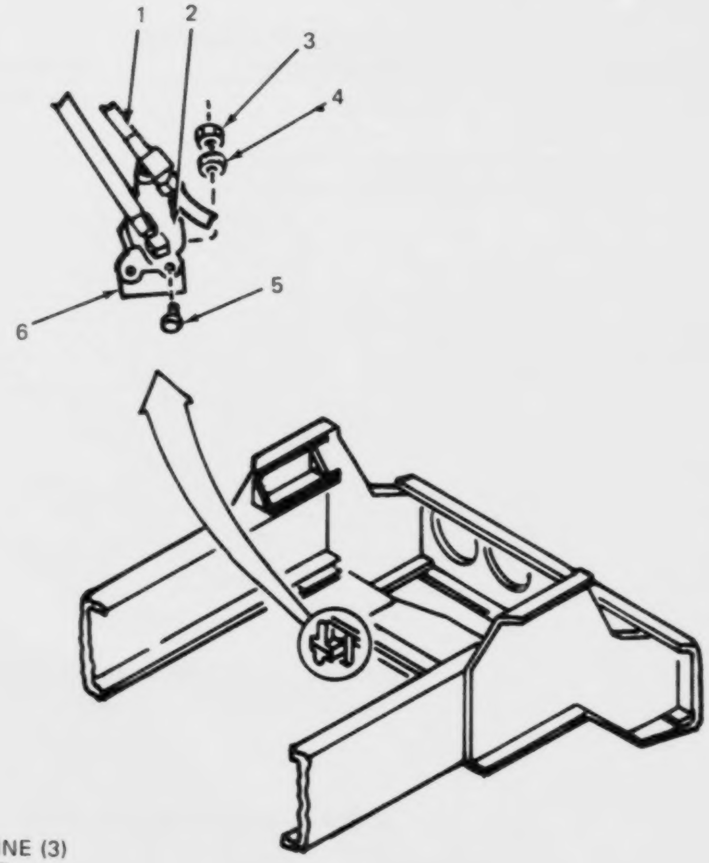
TA 074926

9-25. LIMITING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL .		
1. Three air lines (1).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Damaged fittings.	Replace, if necessary.
2. Two capscrews (5), two washers (4) and two nuts (3).	a. Unscrew and remove. b. Remove valve (2).	
B. INSTALLATION .		
3. Valve (2).	Attach to bracket (6) with two capscrews (5), two washers (4) and two nuts (3).	If a new valve is installed transfer all components (elbows, adapters, etc.) to new valve. Use liquid teflon on threaded joints.
4. Three air lines (1).	a. Coat threads with liquid teflon. b. Screw in and tighten.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM 9-2320-273-10).	
6. CAB/Brake pedal.	Press down.	Second mechanic.
7. Valve (2).	Use soap solution to check for leaks.	First mechanic. Perform this step while brake pedal is pressed down.
8. Vehicle.	Road test. Check for even application of front brakes.	

9-25. LIMITING VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. AIR LINE (3)
2. VALVE
3. NUT (2)
4. WASHER (2)
5. CAPSCREW (2)
6. BRACKET

TA 074927

BRAKE SYSTEM.

9-26. TRACTOR PROTECTION VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(15)
b.	Installation.	(10)
c.	Operational Check.	(10)
		35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Marking Pen.
Masking Tape.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-26. TRACTOR PROTECTION VALVE MAINTENANCE (Continued).

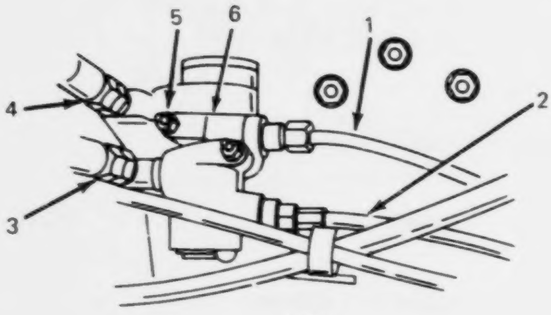
LOCATION/ITEM	ACTION	REMARKS

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.).

WARNING

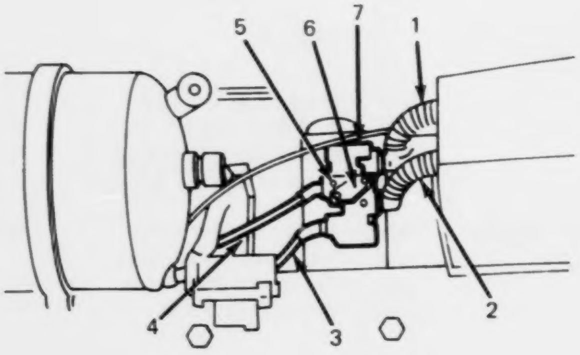
Do not remove tractor protection valve until pressure is fully exhausted from all reservoirs.



M915

LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER, BOLT (2)
6. VALVE



M916, M917, M920

LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER, BOLT (2)
6. SPACER CLIP
7. VALVE

TA 074928

BRAKE SYSTEM.

9-26. TRACTOR PROTECTION VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air lines (1), (2), (3), and (4).	Remove.	Tag lines for ease of location at installation.
2. Two nuts, lockwashers, and bolts (5).	Remove.	
3. Spacer clip (6).	Remove.	(M916, M917, and M920 only.)
4. Valve (7), M916, M917, M920 or valve (6), M915.	Remove.	
5. Valve (7), M916, M917, M920 or valve (6), M915.	Transfer all components (elbows, fittings, adapters, etc.) to new valve. Coat threaded joints with liquid teflon.	If installing new valve.
B. INSTALLATION.		
6. Valve (7), M916, M917, M920 or valve (6), M915.	Install in vehicle.	
7. Spacer clip (6).	Install	(M916, M917, and M920 only.)
8. Two nuts, lockwashers, and bolts (5).	Install and tighten.	
9. Air lines (1), (2), (3), and (4).	Install and tighten.	Replace any damaged lines and/or fittings.
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
11. Valve (7), M916, M917, M920 or valve (6), M915.	Apply trailer supply valve and brake pedal valve. Use soap solution to check for leaks.	Second mechanic

BRAKE SYSTEM.

9-26. TRACTOR PROTECTOR VALVE MAINTENANCE (Continued).

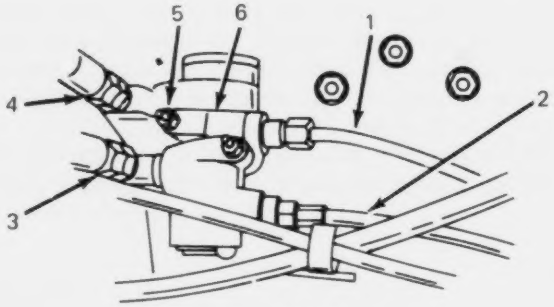
LOCATION/ITEM	ACTION	REMARKS

C. OPERATIONAL CHECK (Continued).

NOTE

If leaks are detected, re-tighten all fittings. If leaks persist, remove hoses and fittings and examine for cracks, and damaged fittings. Replace if necessary.

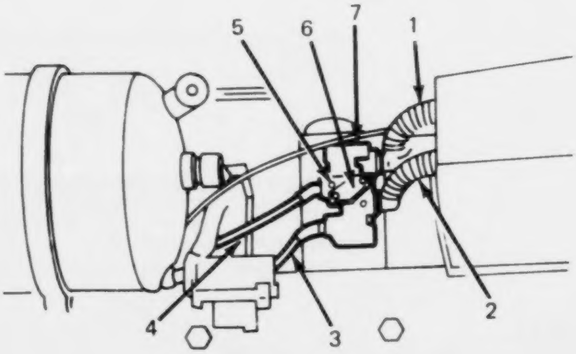
12. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER, BOLT (2)
6. VALVE

M915



LEGEND:

1. AIR LINE
2. AIR LINE
3. AIR LINE
4. AIR LINE
5. NUT, LOCKWASHER, BOLT (2)
6. SPACER CLIP
7. VALVE

M916, M917, M920

TA 074929

BRAKE SYSTEM.

9-27. DOUBLE-CHECK VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
c. Checking for Leaks.	(10)
	25 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Masking Tape.
Marking Pencil.
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-27. DOUBLE-CHECK VALVE MAINTENANCE (Continued).

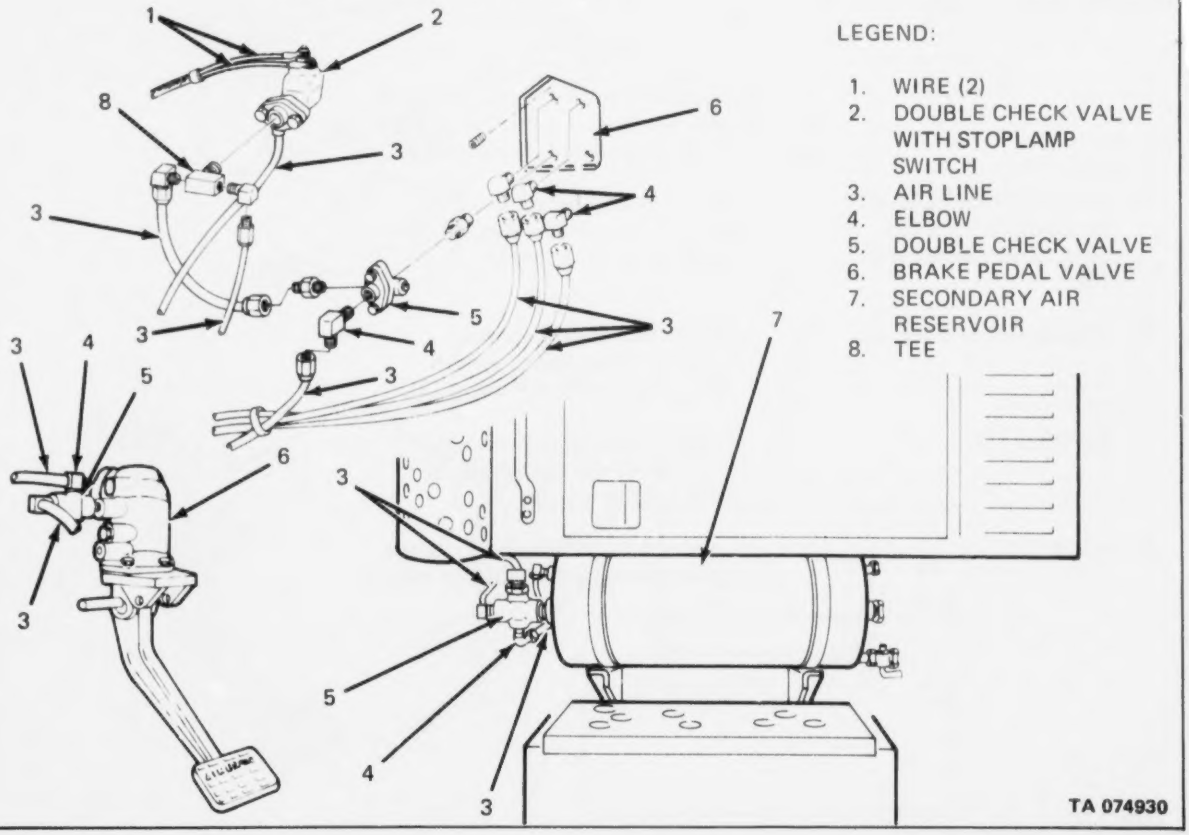
LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not remove double-check valve until pressure is fully exhausted from all reservoirs.

NOTE

For location, refer to locator illustration (para 9-5 e. thru 9-5 j.). Double-check valves are attached to the rear of the secondary air reservoir and to the engine side of the brake pedal valve on all models. There is a double-check valve on the driver's side of the brake pedal valve on all models except the M918 and M919. All models use a double check valve with stoplamp switch attached to the engine side of the firewall near the brake pedal valve. The procedure below is general and may be used to service any of these double-check valves.



LEGEND:

1. WIRE (2)
2. DOUBLE CHECK VALVE WITH STOPLAMP SWITCH
3. AIR LINE
4. ELBOW
5. DOUBLE CHECK VALVE
6. BRAKE PEDAL VALVE
7. SECONDARY AIR RESERVOIR
8. TEE

TA 074930

9-27. DOUBLE-CHECK VALVE MAINTENANCE (Continued).

A. REMOVAL.

NOTE

Before removing air lines, use masking tape and marking pencil to identify air lines for installation in their proper location.

LOCATION/ITEM	ACTION	REMARKS
1. Wires (1), air lines (3), and tee (8).	Remove from double-check valve with stoplamp switch (2).	Replace if damaged.
2. Double-check valve with stoplamp switch (2).	Unscrew and remove.	
3. Air lines (3) and elbows (4).	Unscrew from double-check valve (5).	Replace if damaged.
4. Double-check valve (5).	Unscrew and remove.	

B. INSTALLATION.

NOTE

Apply liquid teflon to threads of valves, elbows, and tee as you assemble per the locations you marked at disassembly.

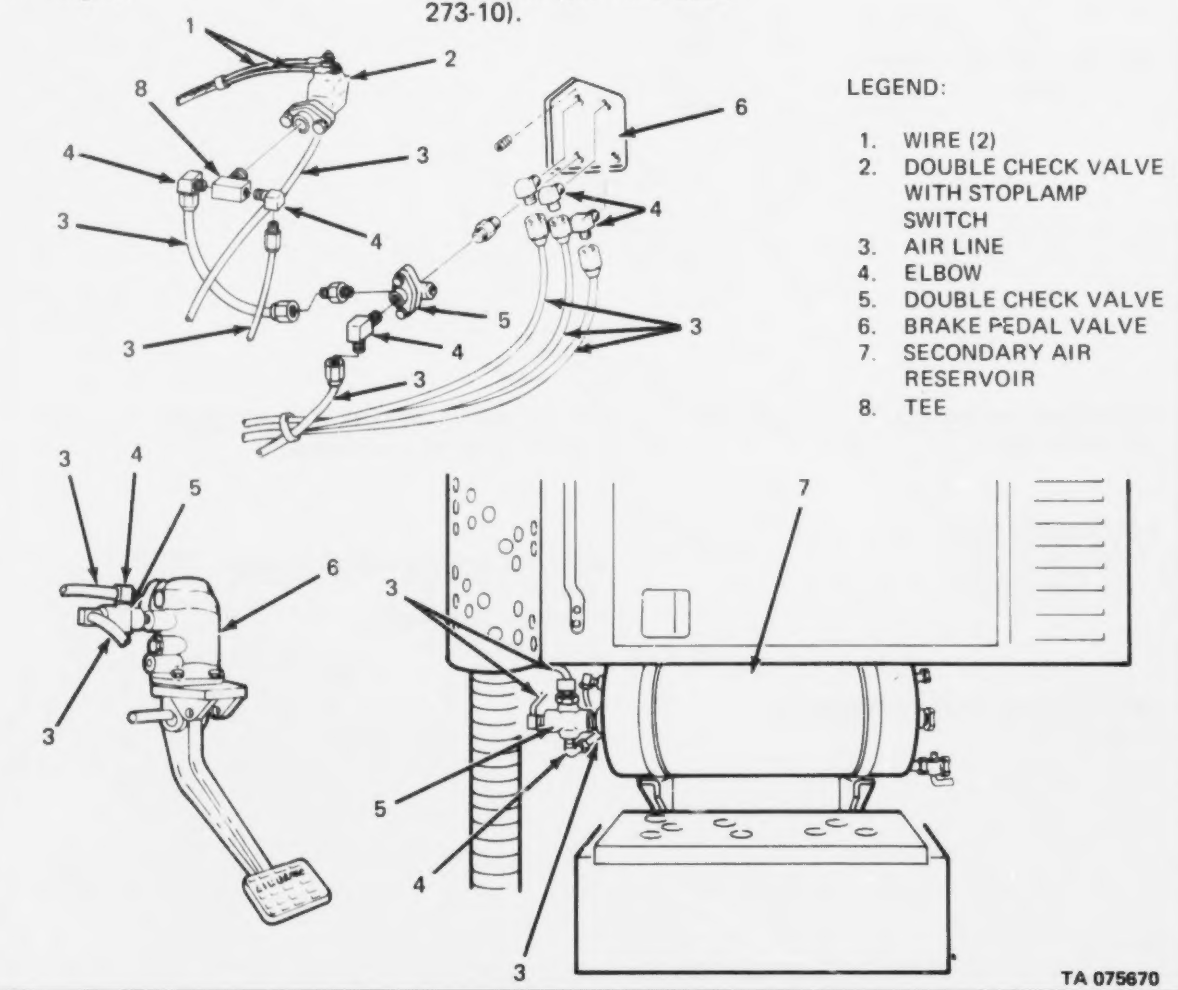
LOCATION/ITEM	ACTION	REMARKS
5. Double-check valve with stoplamp switch (2) or double-check valve (5).	Screw in and tighten to firewall, brake pedal valve (6), or secondary air reservoir (7).	
6. Elbows (4) and tee (8).	Screw into double-check valve with stoplamp switch (2) or double-check valve (5).	
7. Air lines (3).	Install at double-check valve with stoplamp switch (2) or double-check valve (5).	
8. Wires (1).	Connect to terminals of double-check valve with stoplamp switch (2).	

BRAKE SYSTEM.

9-27. DOUBLE-CHECK VALVE MAINTENANCE (Continued).

C. CHECKING FOR LEAKS.

LOCATION/ITEM	ACTION	REMARKS
9. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
10. Double-check valve with stoplamp switch (2), double-check valve (5), air lines (3), elbows (4), and tee (8).	Use soap solution to check for leaks.	Tighten as necessary.
11. Engine.	Shut down (see TM 9-2320-273-10).	



LEGEND:

1. WIRE (2)
2. DOUBLE CHECK VALVE WITH STOPLAMP SWITCH
3. AIR LINE
4. ELBOW
5. DOUBLE CHECK VALVE
6. BRAKE PEDAL VALVE
7. SECONDARY AIR RESERVOIR
8. TEE

BRAKE SYSTEM.

9-28. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M918 AND M919).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(10)
b.	Installation.	(10)
c.	Operational Check.	(10)
		30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
M918 and M919.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED
One (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES
Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

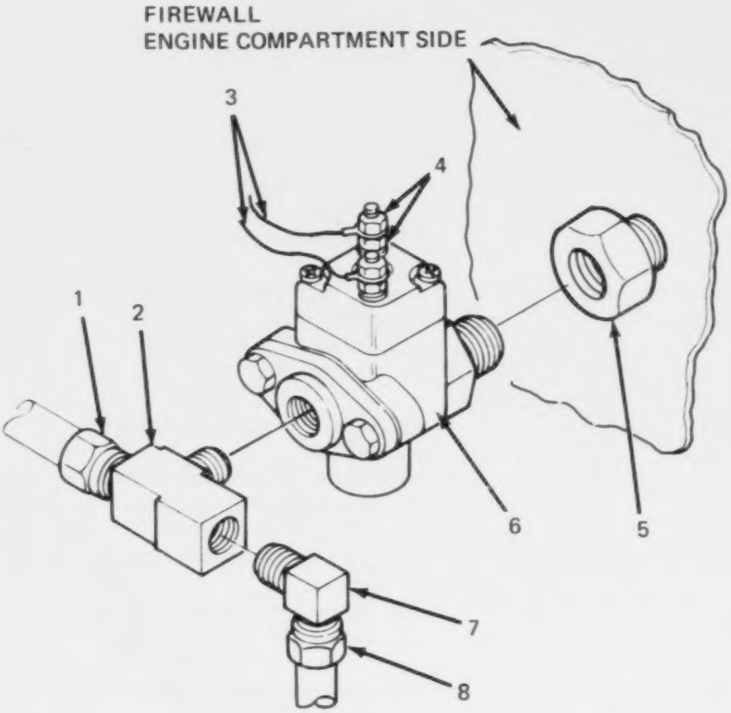
GENERAL SAFETY INSTRUCTIONS
Engine OFF.
Transmission in Neutral.
Park Brake Set.

BRAKE SYSTEM.

9-28. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M918 AND M919) (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Fittings (1) and (8).	Unscrew and remove two air lines.	Mark location for reassembly.
2. Tee (2).	Unscrew and remove.	


FIREWALL
ENGINE COMPARTMENT SIDE
3
4
1
2
6
5
7
8

LEGEND:

1. FITTING
2. TEE
3. WIRE (2)
4. TERMINAL NUT (2)
5. BULKHEAD FITTING
6. DOUBLE CHECK AND STOPLAMP VALVE
7. ELBOW
8. FITTING

TA 074932

BRAKE SYSTEM.

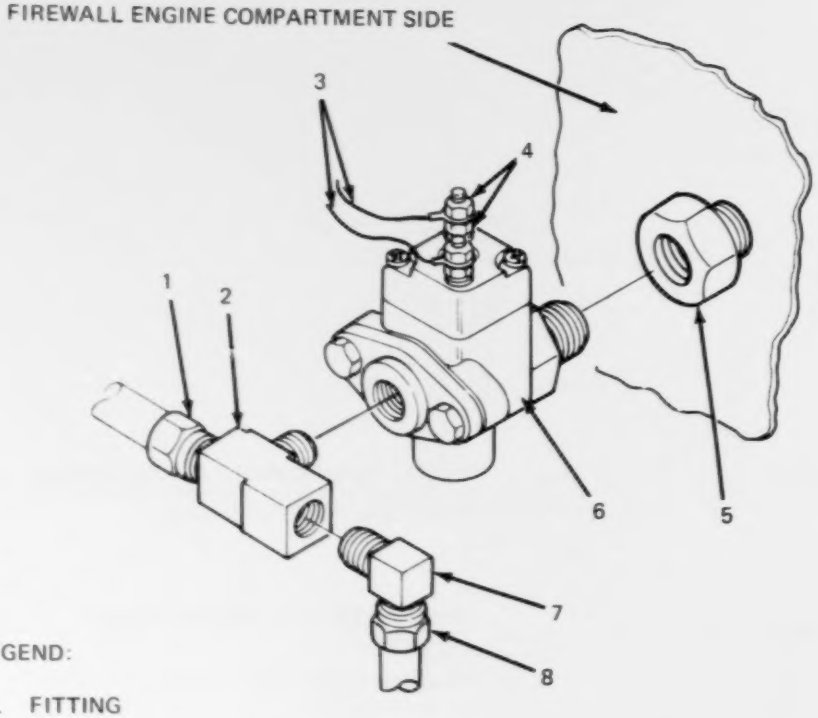
9-28. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M918 AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two terminal nuts (4).	Unscrew and remove two wires (3).	Mark location for reassembly.
4. Double-check and stoplamp valve (6).	Unscrew from bulkhead fitting (5).	
5. Elbow (7).	Unscrew and remove from tee (2).	
B. INSTALLATION.		
6. Elbow (7).	a. Coat threads with liquid teflon. b. Screw into tee (2).	
7. Double-check and stoplamp valve (6).	a. Coat threads with liquid teflon. b. Screw into bulkhead fitting (5).	
8. Tee (2).	a. Coat threads with liquid teflon. b. Screw into double-check and stoplamp valve (6).	
9. Fittings (1) and (8).	a. Coat threads with liquid teflon. b. Screw into tee (2) and elbow (7).	 Install as previously marked.
10. Two wires (3).	Install over terminals and secure with two terminal nuts (4).	Install as previously marked.

BRAKE SYSTEM.

9-28. DOUBLE-CHECK AND STOPLIGHT VALVE MAINTENANCE (M918 AND M919) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK .		
11. Vehicle.	Road test. Check operation of: a. Service brakes. b. Park brakes. c. Trailer brakes. d. Stoplamps.	Tighten fittings as necessary to stop any detected air leaks.



LEGEND:

1. FITTING
2. TEE
3. WIRE (2)
4. TERMINAL NUT (2)
5. BULKHEAD FITTING
6. DOUBLE CHECK AND STOPLAMP VALVE
7. ELBOW
8. FITTING

TA 074933

9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920)

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(15)
c. Operational Check.	(10)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M917, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Secondary Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

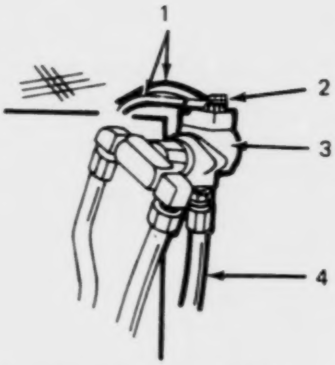
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

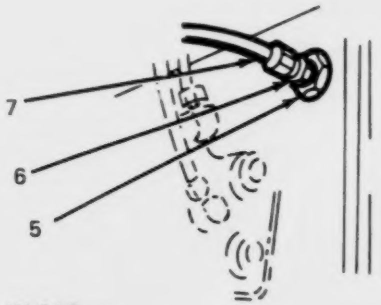
9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920) (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two nuts and washers (2).	Remove.	
2. Two wires (1).	Remove from stoplamp switch terminals.	Tag for location.
3. Three air lines (4).	Remove.	Tag for location.
4. Air line (7).	Remove.	In cab.



ENGINE COMPARTMENT/FIREWALL



IN CAB

LEGEND:

1. WIRE (2)
2. NUT AND WASHER (2)
3. VALVE
4. AIR LINE (3)
5. NUT
6. ADAPTER
7. AIR LINE

TA 074934

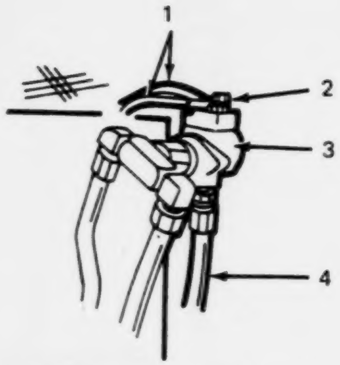
9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Adapter (6).	Remove.	In cab.
6. Nut (5).	Remove.	In cab. 2nd mechanic to hold valve to keep from twisting while nut removed.
7. Valve (3).	Remove from vehicle.	
8. Valve (3).	Remove elbows, adapters, tee's from valve.	
B. INSTALLATION.		
9. Valve (3).	Install elbows, tee's, adapters in valve.	Coat threads with liquid teflon.
10. Valve (3).	Install in vehicle.	
11. Nut (5).	Install on valve.	2nd mechanic to hold valve from turning during tightening.
12. Adapter (6).	Install.	Coat threads with liquid teflon.
13. Air line (7).	Install.	
14. Three air lines (4).	Install.	
15. Two wires (1).	Install on terminals.	
16. Two nuts and washers (2).	Install.	

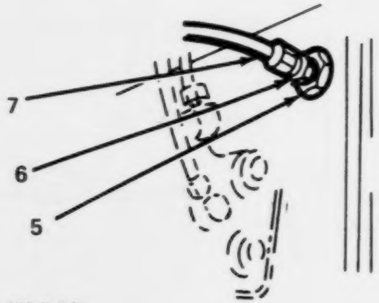
9-29. DOUBLE-CHECK AND STOPLAMP VALVE MAINTENANCE (M915, M916, M917, M920) (Continued).

C. OPERATIONAL CHECK.

LOCATION/ITEM	ACTION	REMARKS
17. Vehicle	Road test check operation of: a. Service brakes. b. Park brakes. c. Trailer brakes. d. Stoplamps.	



ENGINE COMPARTMENT/FIREWALL



IN CAB

LEGEND:

1. WIRE (2)
2. NUT AND WASHER (2)
3. VALVE
4. AIR LINE (3)
5. NUT
6. ADAPTER
7. AIR LINE

TA 074935

BRAKE SYSTEM.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

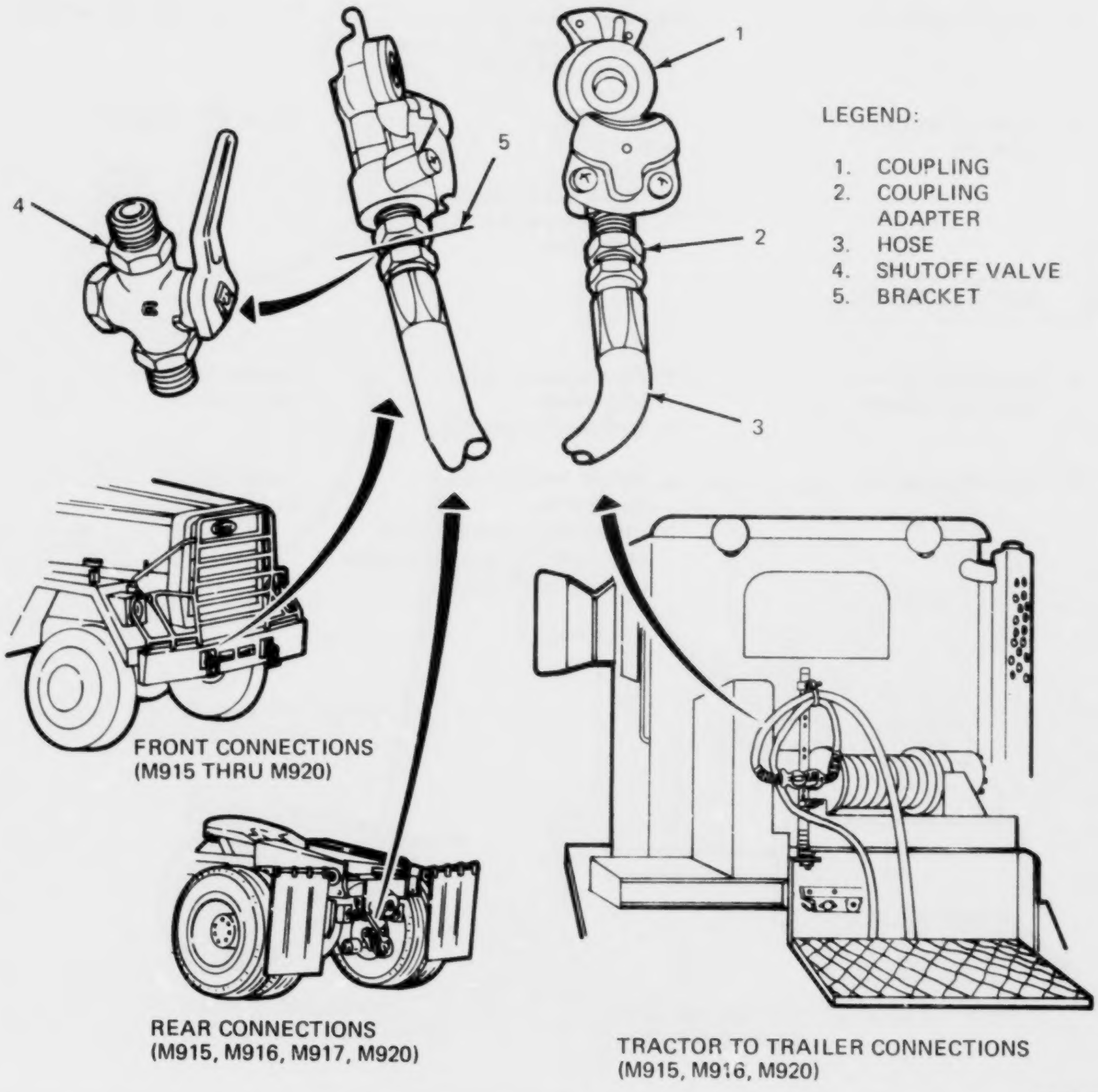
Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not remove couplings until pressure is fully exhausted from all reservoirs.



LEGEND:

1. COUPLING
2. COUPLING ADAPTER
3. HOSE
4. SHUTOFF VALVE
5. BRACKET

FRONT CONNECTIONS
(M915 THRU M920)

REAR CONNECTIONS
(M915, M916, M917, M920)

TRACTOR TO TRAILER CONNECTIONS
(M915, M916, M920)

TA 074936

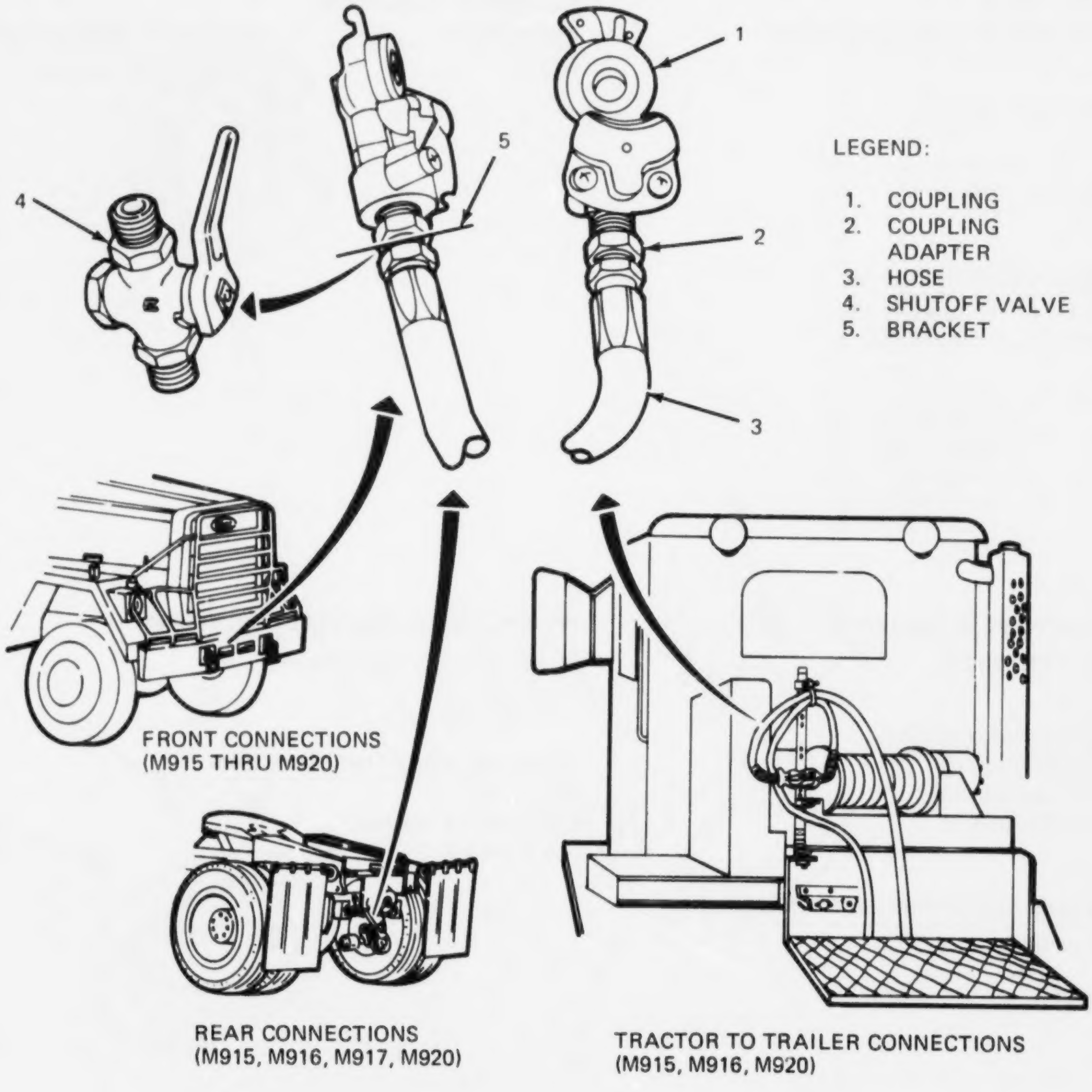
BRAKE SYSTEM.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Couplings (1) and couplings adapter (2).	Unscrew and remove from hoses (3).	Tractor to trailer connections.
2. Shutoff valve (4).	Unscrew from coupling (1), coupling adapter (2), hose (3) and bracket (5).	Front and rear connections.
3. Hose (3) and shut-off valve (4).	Inspect for: a. Leaks. b. Cracks. c. Damaged fittings. d. Smooth valve handle operation.	Replace if necessary.
B. INSTALLATION.		
4. Couplings (1) and couplings adapter (2).	a. Apply liquid teflon to threads. b. Screw on hoses (3).	Tractor to trailer connections.
5. Shutoff valve (4).	a. Apply liquid teflon to threads. b. Install thru bracket(s) to coupling (1), coupling adapter (2), and hose (3).	Front and rear connections.

9-30. EXTERNAL AIR COUPLINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
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LEGEND:
1. COUPLING
2. COUPLING ADAPTER
3. HOSE
4. SHUTOFF VALVE
5. BRACKET
FRONT CONNECTIONS
(M915 THRU M920)
REAR CONNECTIONS
(M915, M916, M917, M920)
TRACTOR TO TRAILER CONNECTIONS
(M915, M916, M920)
TA 074937

9-31. FRONT BRAKE SHOES MAINTENANCE (M915).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Adjustment.	(15)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Cotter Pin, K-227 (78500).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
10-13A.	Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

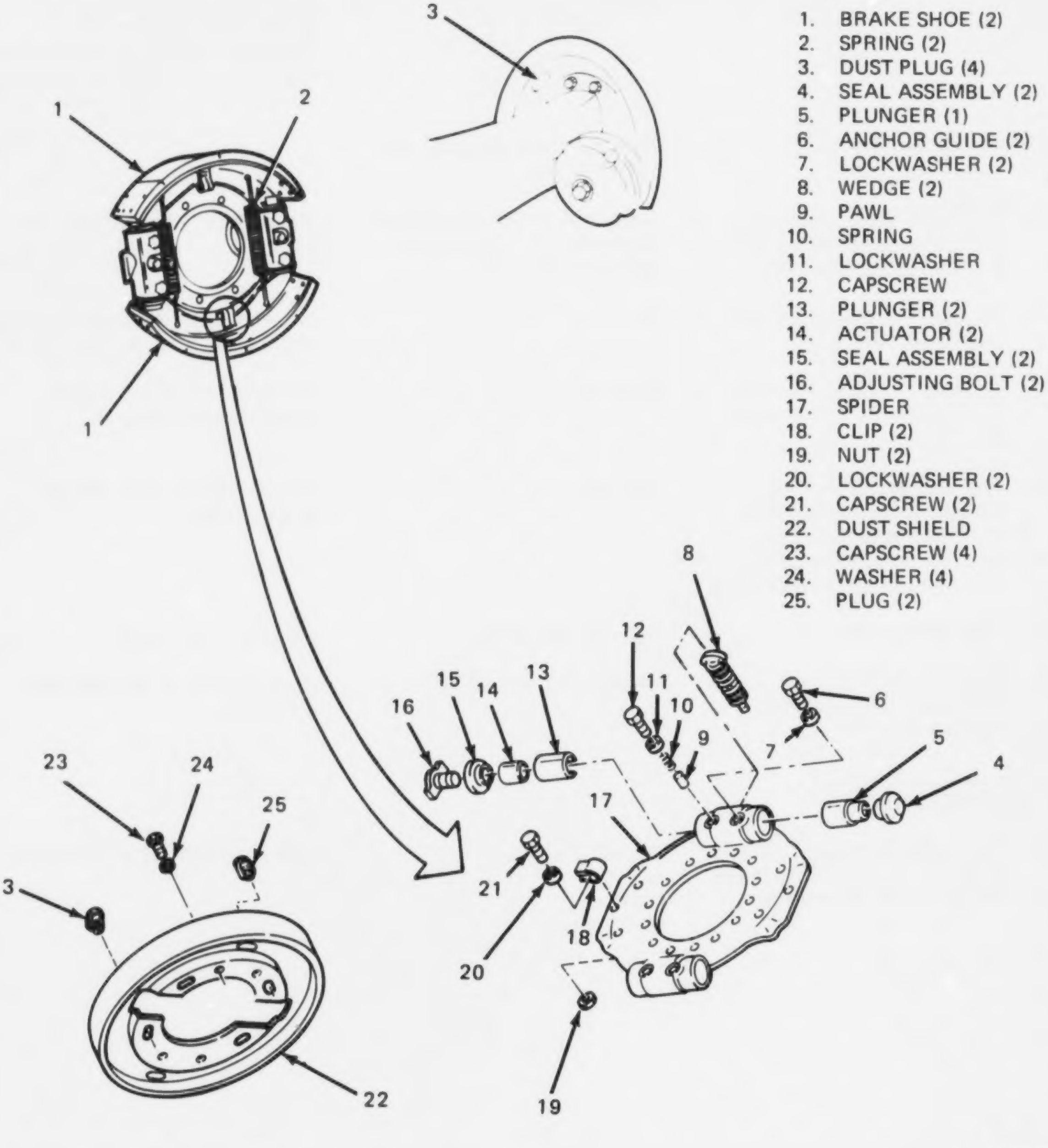
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. BRAKE SHOE (2)
2. SPRING (2)
3. DUST PLUG (4)
4. SEAL ASSEMBLY (2)
5. PLUNGER (1)
6. ANCHOR GUIDE (2)
7. LOCKWASHER (2)
8. WEDGE (2)
9. PAWL
10. SPRING
11. LOCKWASHER
12. CAPSCREW
13. PLUNGER (2)
14. ACTUATOR (2)
15. SEAL ASSEMBLY (2)
16. ADJUSTING BOLT (2)
17. SPIDER
18. CLIP (2)
19. NUT (2)
20. LOCKWASHER (2)
21. CAPSCREW (2)
22. DUST SHIELD
23. CAPSCREW (4)
24. WASHER (4)
25. PLUG (2)

TA 074938

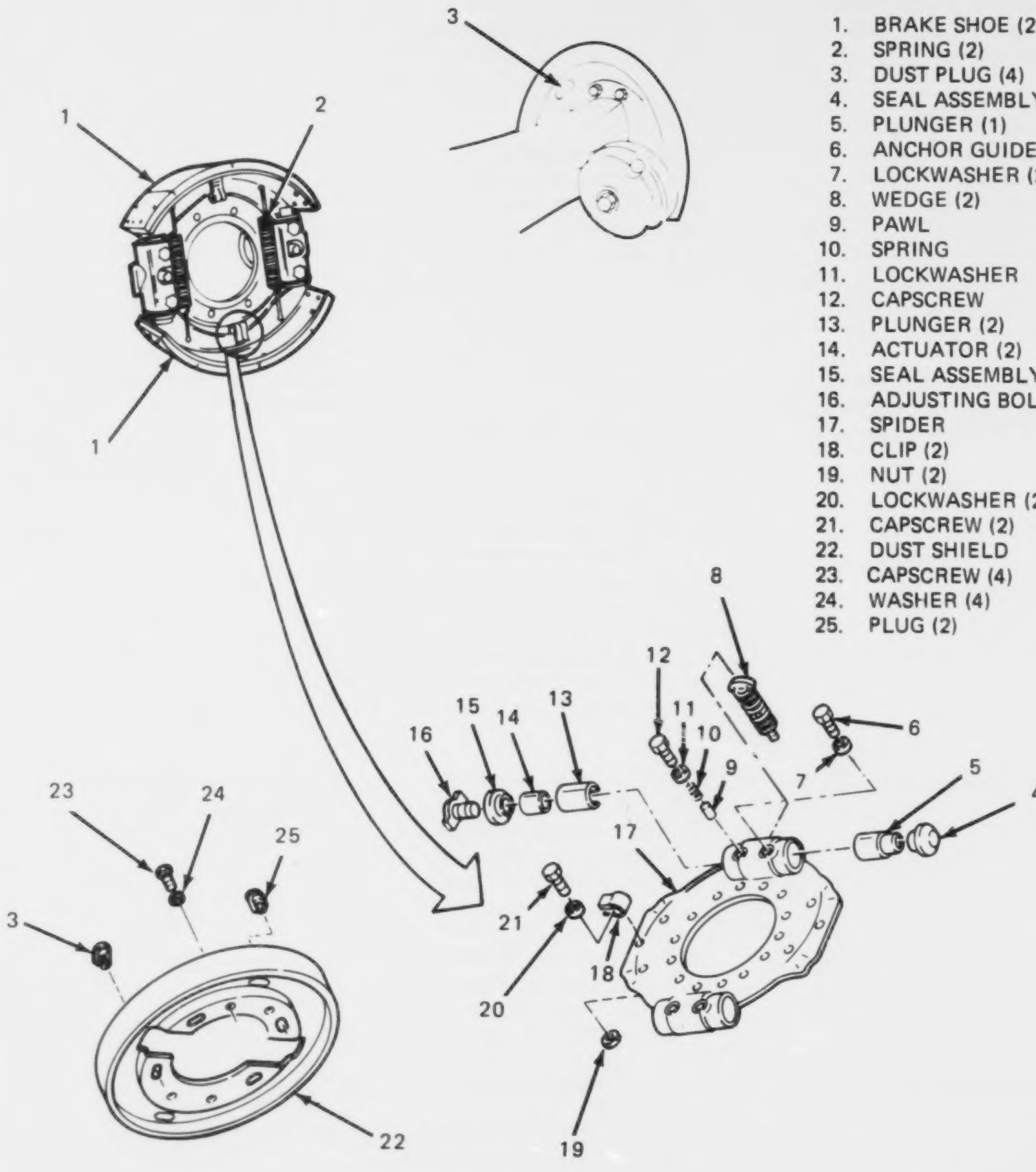
BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two brake springs (2).	Remove with brake spring pliers.	Place notched tip of pliers against hood on spring, unnotched tip against inner ridge of brake shoe (1), squeezing pliers to stretch spring and remove it from the notch.
2. Two brake shoes (1).	Remove from clip (18) and lift off shoes.	
3. Two clips (18), two nuts (19), two lockwashers (20), and two capscrews (21).	Loosen nut (19) and remove capscrew (21), lockwasher (20) and clip (18).	Remove only if damaged or broken.
4. Two anchor guides (6) and two lockwashers (7).	Remove.	Remove only if service on actuator is needed.
5. Capscrew (12), lockwasher (11), spring (10), and pawl (9).	Remove.	Remove only if service on actuator is needed.
6. Two seal assemblies (4), plunger (5), two plungers (13), two actuators (14), two seal assemblies (15), and two adjusting bolts (16).	Remove.	Clean, inspect, and replace as necessary.
7. Two wedges (8).	Remove and clean.	Replace if damaged.
8. Dust shield (22), four capscrews (23), and four washers (24).	Unscrew capscrews (23).	Remove only if replacement is needed.
B. INSPECTION.		
9. Two brake springs (2), brake shoes (1), seal assemblies (4) and (15) and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage.	Clean and replace as necessary.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. BRAKE SHOE (2)
2. SPRING (2)
3. DUST PLUG (4)
4. SEAL ASSEMBLY (2)
5. PLUNGER (1)
6. ANCHOR GUIDE (2)
7. LOCKWASHER (2)
8. WEDGE (2)
9. PAWL
10. SPRING
11. LOCKWASHER
12. CAPSCREW
13. PLUNGER (2)
14. ACTUATOR (2)
15. SEAL ASSEMBLY (2)
16. ADJUSTING BOLT (2)
17. SPIDER
18. CLIP (2)
19. NUT (2)
20. LOCKWASHER (2)
21. CAPSCREW (2)
22. DUST SHIELD
23. CAPSCREW (4)
24. WASHER (4)
25. PLUG (2)

TA 074940

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

C. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
10. Dust shield (22), four capscrews (23), and four washers (24).	Install dust shield (22) and secure with capscrews (23) and washers (24).	
11. Two wedges (8).	Install into spider (17).	
12. Plunger (5), two seal assemblies (4), two plungers (13), two actuators (14), two seal assemblies (15), two adjusting bolts (16), two anchor guides (6), and two lockwashers (7).	Install into spider (17) and secure with anchor guide (6), lockwasher (7), capscrew (12), lockwasher (11), spring (10), and pawl (9).	
13. Two clips (18), two nuts (19), two lockwashers (20), and two capscrews (21).	Install clips (18) and secure with capscrews (21), lockwashers (20), and nuts (19).	Install new if previously removed.

CAUTION

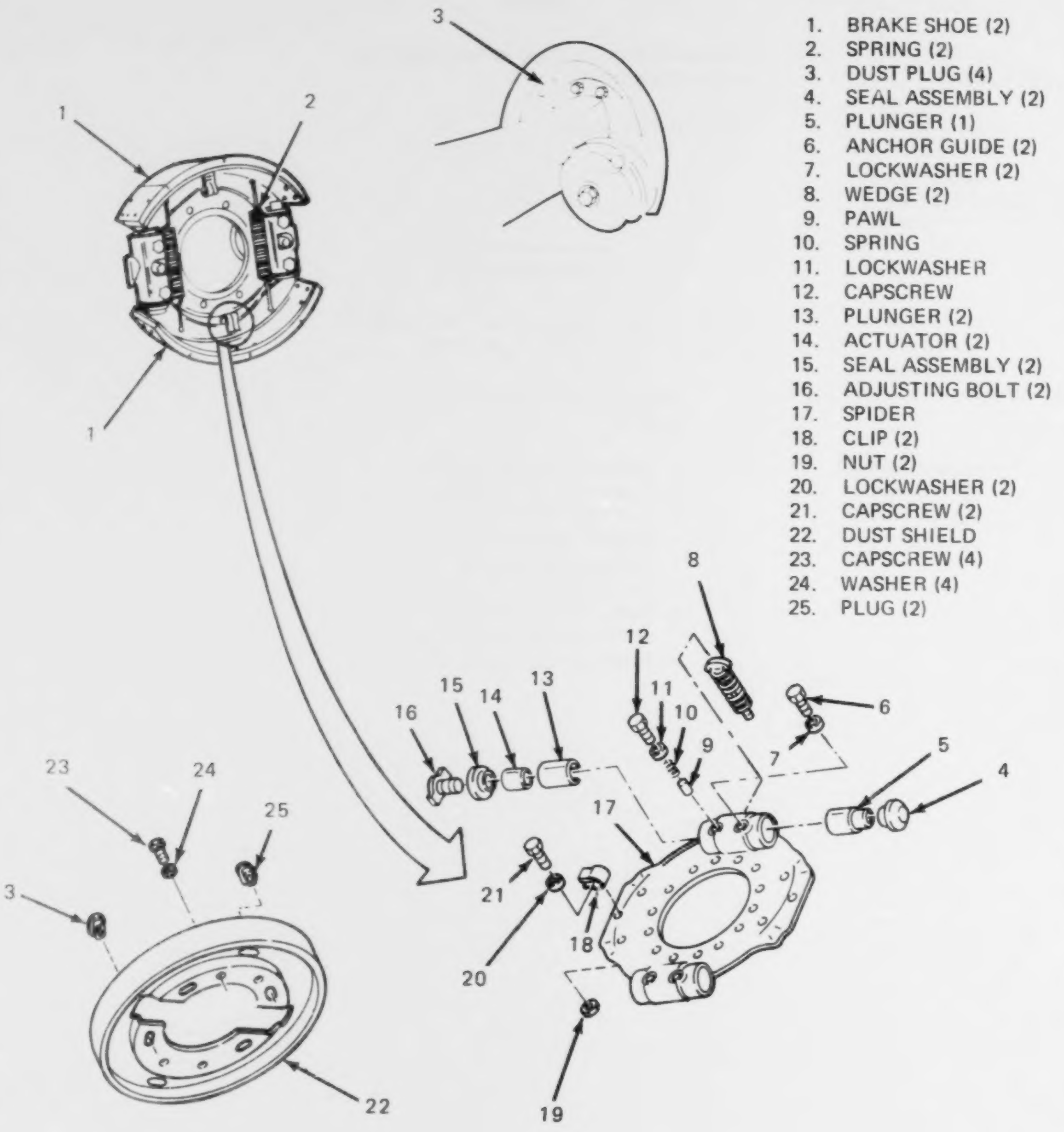
If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.

LOCATION/ITEM	ACTION	REMARKS
14. Two brake shoes (1).	a. Apply a thin film of grease to plunger (5) slots for adjusting bolt (16) and shoe rest pads. b. Position shoes on assembly with pads resting in slots for adjusting bolt (16). c. Double-check to be sure that arrows on shoes point in the direction that wheel will rotate.	Do NOT get any grease on the braking surfaces.
15. Two springs (2).	a. Turn to latch shoes in position. b. Install with brake spring pliers. Curved part of each spring must be towards adjacent brake cylinder.	

BRAKE SYSTEM.

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. BRAKE SHOE (2)
2. SPRING (2)
3. DUST PLUG (4)
4. SEAL ASSEMBLY (2)
5. PLUNGER (1)
6. ANCHOR GUIDE (2)
7. LOCKWASHER (2)
8. WEDGE (2)
9. PAWL
10. SPRING
11. LOCKWASHER
12. CAPSCREW
13. PLUNGER (2)
14. ACTUATOR (2)
15. SEAL ASSEMBLY (2)
16. ADJUSTING BOLT (2)
17. SPIDER
18. CLIP (2)
19. NUT (2)
20. LOCKWASHER (2)
21. CAPSCREW (2)
22. DUST SHIELD
23. CAPSCREW (4)
24. WASHER (4)
25. PLUG (2)

TA 075671

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

C. INSTALLATION (Continued).

NOTE

Follow-on maintenance action required before adjustment:

Para 10-12B and C.

D. ADJUSTMENT.

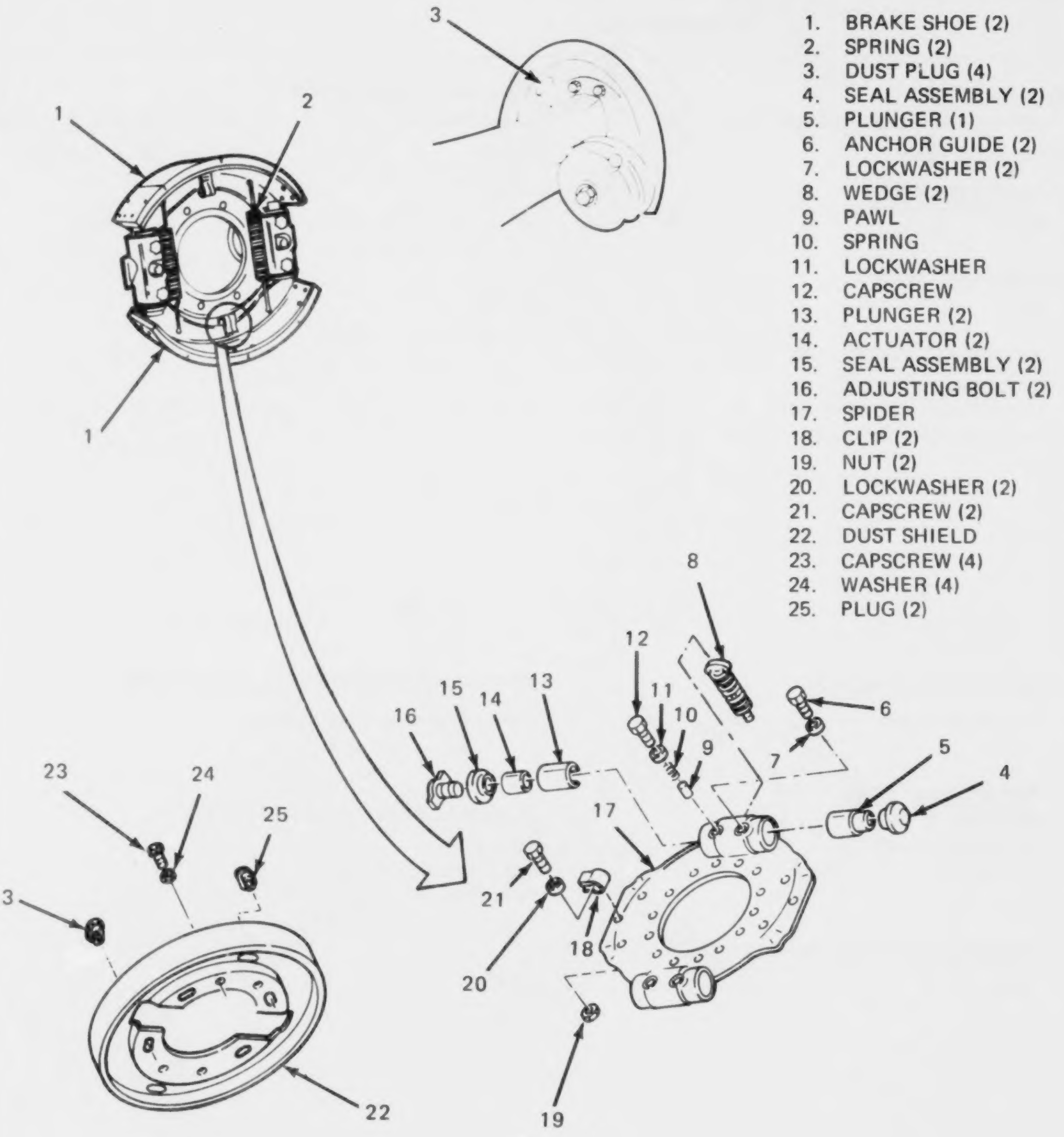
WARNING

If jack is used, support truck with blocks so that it will not fall if jack slips.

LOCATION/ITEM	ACTION	REMARKS
16. Wheel.	Jack or hoist free of ground.	
17. Two dust plugs (3).	a. Remove dust plugs (3). b. Insert adjusting spoon. c. Turn starwheel bolt (inside slot) until brakes drag heavily on drums. d. Back off starwheel just until wheels turn freely. e. Replace dust plugs (3).	

9-31. FRONT BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. BRAKE SHOE (2)
2. SPRING (2)
3. DUST PLUG (4)
4. SEAL ASSEMBLY (2)
5. PLUNGER (1)
6. ANCHOR GUIDE (2)
7. LOCKWASHER (2)
8. WEDGE (2)
9. PAWL
10. SPRING
11. LOCKWASHER
12. CAPSCREW
13. PLUNGER (2)
14. ACTUATOR (2)
15. SEAL ASSEMBLY (2)
16. ADJUSTING BOLT (2)
17. SPIDER
18. CLIP (2)
19. NUT (2)
20. LOCKWASHER (2)
21. CAPSCREW (2)
22. DUST SHIELD
23. CAPSCREW (4)
24. WASHER (4)
25. PLUG (2)

TA 075672

BRAKE SYSTEM.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Adjustment.	(15)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Cotter Pin (2), K227 (78500).
Seal, 1205-E-1409 (78500).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
10-14A.	Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20)..

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

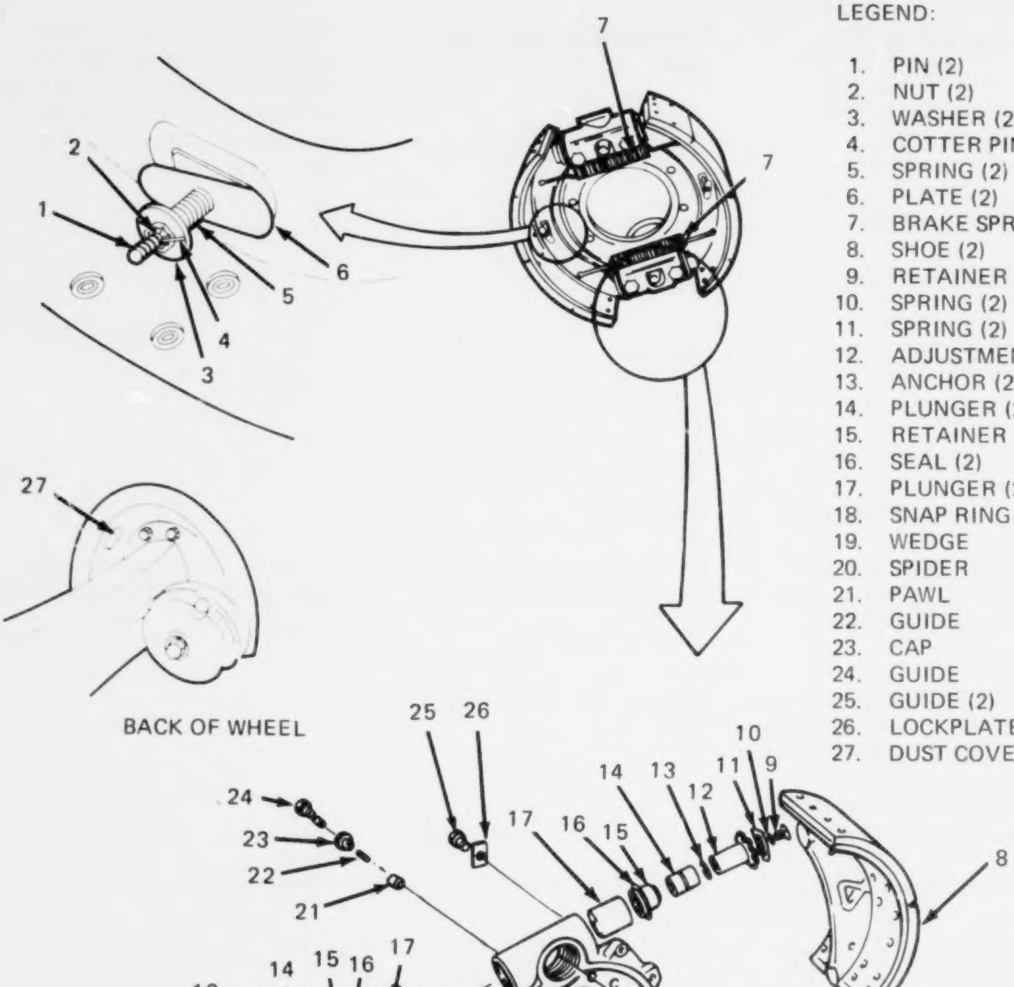
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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BACK OF WHEEL
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LEGEND:

1. PIN (2)
2. NUT (2)
3. WASHER (2)
4. COTTER PIN (2)
5. SPRING (2)
6. PLATE (2)
7. BRAKE SPRING (2)
8. SHOE (2)
9. RETAINER (2)
10. SPRING (2)
11. SPRING (2)
12. ADJUSTMENT BOLT (2)
13. ANCHOR (2)
14. PLUNGER (2)
15. RETAINER (2)
16. SEAL (2)
17. PLUNGER (2)
18. SNAP RING
19. WEDGE
20. SPIDER
21. PAWL
22. GUIDE
23. CAP
24. GUIDE
25. GUIDE (2)
26. LOCKPLATE (2)
27. DUST COVER (2)

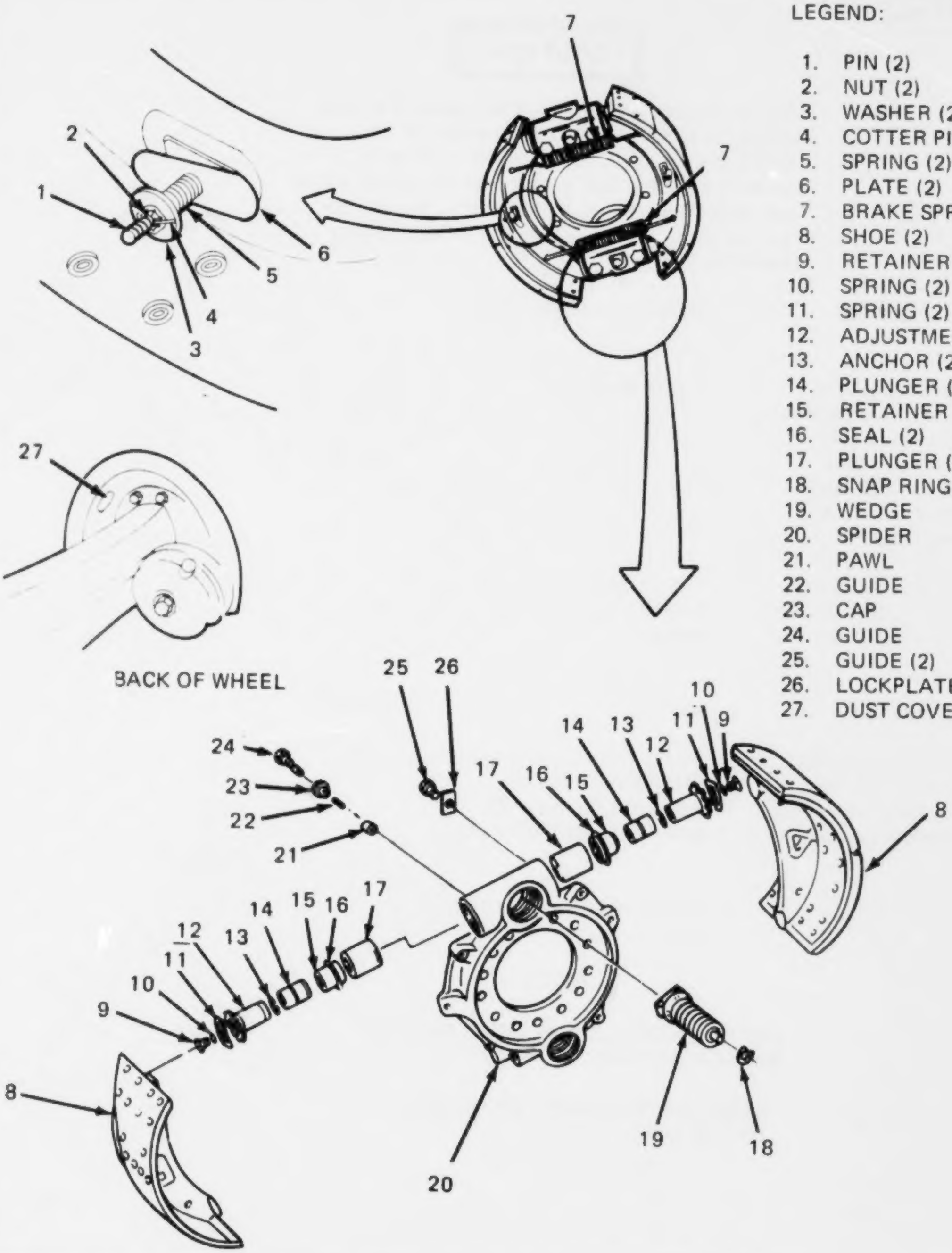
TA 075673

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two brake springs (7).	Remove with brake spring pliers.	Place notched tip of pliers against hood on spring, unnotched tip against inner ridge of brake shoe (8), squeezing pliers to stretch spring and remove it from the notch.
2. Two cotter pins (4).	Remove and discard.	
3. Two nuts (2) and washers (3).	Remove.	
4. Two springs (5).	Remove.	
5. Two plates (6).	Remove.	
6. Two pins (1).	Remove.	
7. Two brake shoes (8).	Remove.	
8. Guide (24), and (22), cap (23), pawl (21), two guides (25), and two lock plates (26).	Remove to provide access to wedge cylinder parts.	Remove for inspection, not normally needed unless trouble is indicated.
9. Two retainers (9), two springs (10) and (11), two adjusting bolts (12), two anchors (13), two plungers (14), two retainers (15), two seals (16), and two plungers (17).	Remove and clean; discard seals (16).	
10. Snap ring (18) and wedge (19).	Remove for inspection.	Replace if damaged.
B. INSPECTION.		
11. Brake springs (7), shoes (8), and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage.	Replace as necessary.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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18

LEGEND:

1. PIN (2)
2. NUT (2)
3. WASHER (2)
4. COTTER PIN (2)
5. SPRING (2)
6. PLATE (2)
7. BRAKE SPRING (2)
8. SHOE (2)
9. RETAINER (2)
10. SPRING (2)
11. SPRING (2)
12. ADJUSTMENT BOLT (2)
13. ANCHOR (2)
14. PLUNGER (2)
15. RETAINER (2)
16. SEAL (2)
17. PLUNGER (2)
18. SNAP RING
19. WEDGE
20. SPIDER
21. PAWL
22. GUIDE
23. CAP
24. GUIDE
25. GUIDE (2)
26. LOCKPLATE (2)
27. DUST COVER (2)

TA 075674

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

C. INSTALLATION.

CAUTION

If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.

LOCATION/ITEM	ACTION	REMARKS
12. Wedge (19) and snap ring (18).	Install into spider (20).	
13. Two plungers (17), two new seals (16), two retainers (15), two plungers (14), two anchors (13), two adjusting bolts (12), two springs (10) and (11) and two retainers (9).	Install as shown.	
14. Guides (24) and (22), cap (23), pawl (21), two guides (25), and two lockplates (26).	Install pawl (21) with guides (24) and (22), and cap (23).	
15. Two brake shoes (8).	Install.	
16. Two pins (1), two plates (6), two springs (5), two washers (3), two nuts (2), and two new cotter pins (4).	Install pins (1) and plates (6) with springs (5), washers (3), nuts (2), and new cotter pins (4).	
17. Two springs (7).	Install with brake spring pliers.	

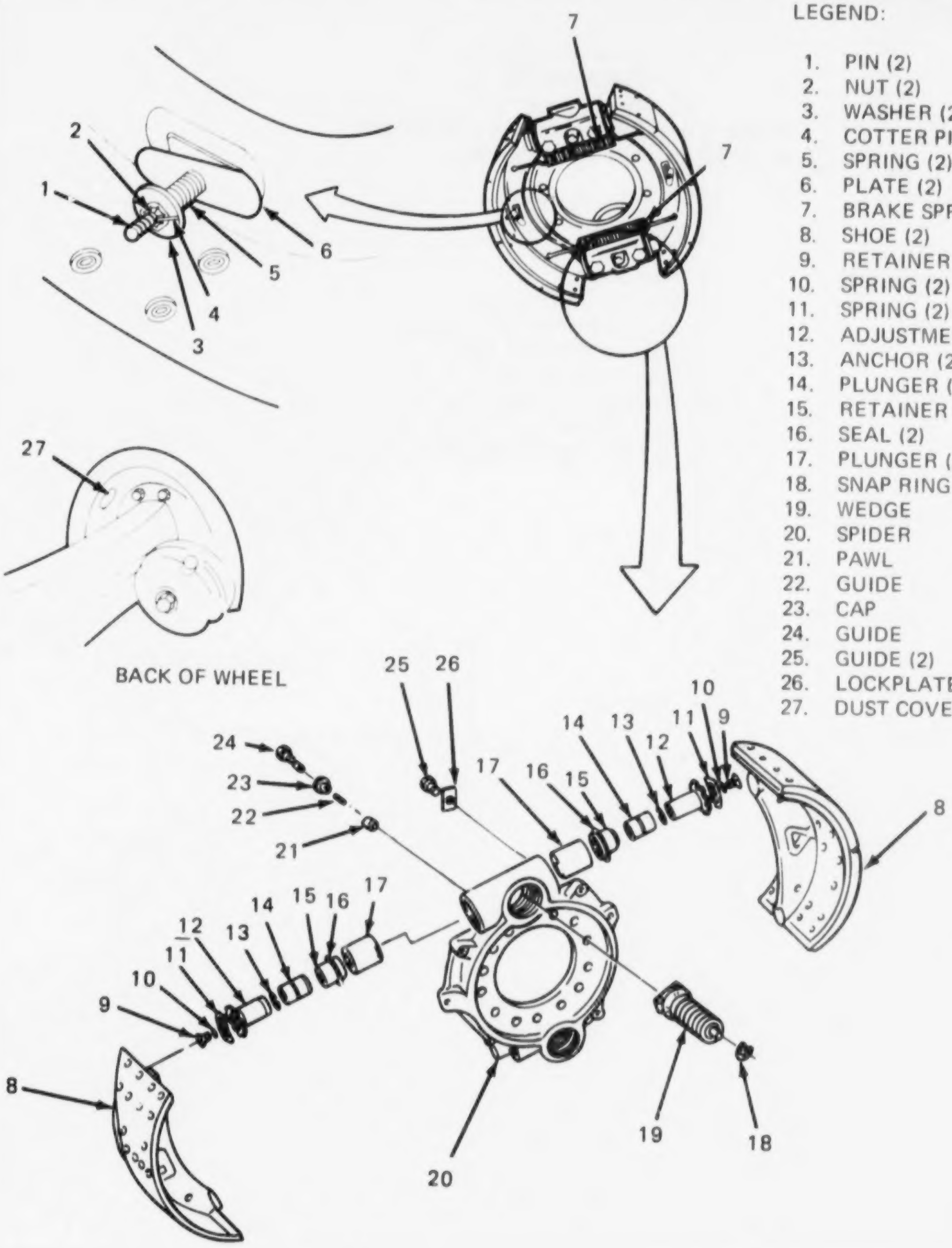
NOTE

Follow-on maintenance action required before adjustment:

Install hub and drum; refer to para 10-14B and C.

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. PIN (2)
2. NUT (2)
3. WASHER (2)
4. COTTER PIN (2)
5. SPRING (2)
6. PLATE (2)
7. BRAKE SPRING (2)
8. SHOE (2)
9. RETAINER (2)
10. SPRING (2)
11. SPRING (2)
12. ADJUSTMENT BOLT (2)
13. ANCHOR (2)
14. PLUNGER (2)
15. RETAINER (2)
16. SEAL (2)
17. PLUNGER (2)
18. SNAP RING
19. WEDGE
20. SPIDER
21. PAWL
22. GUIDE
23. CAP
24. GUIDE
25. GUIDE (2)
26. LOCKPLATE (2)
27. DUST COVER (2)

TA 075675

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

D. ADJUSTMENT.

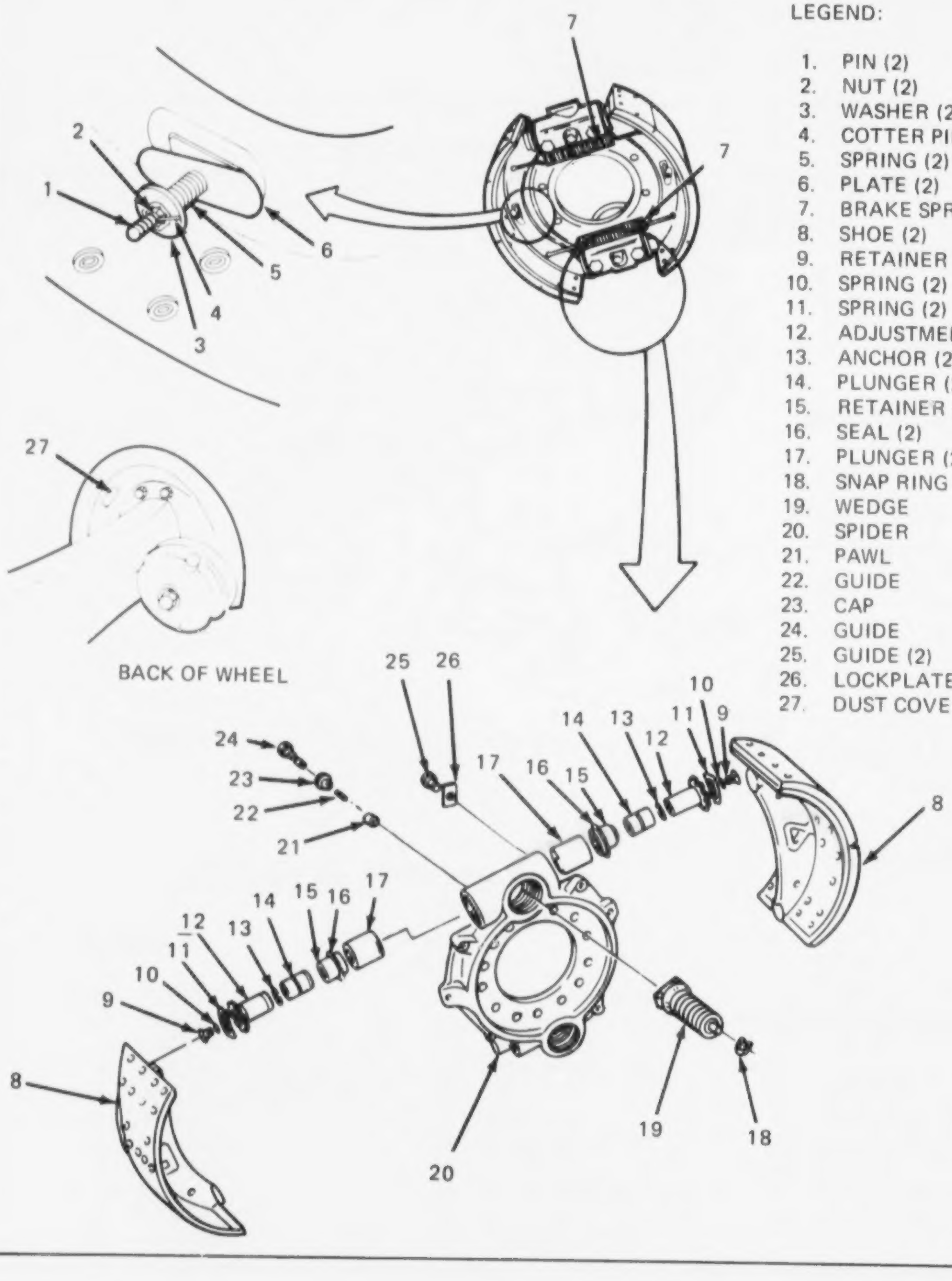
WARNING

If jack is used, support truck with blocks so that it will not fall if jack slips.

LOCATION/ITEM	ACTION	REMARKS
18. Wheel.	Jack or hoist free of ground.	
19. Two dust covers (27).	a. Remove. b. Insert adjusting tool. c. Turn starwheel bolt (inside slot) until brakes drag heavily on drums. d. Back off starwheel just until wheels turn freely. e. Replace dust covers (27).	

9-32. FRONT BRAKE SHOES MAINTENANCE (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. PIN (2)
2. NUT (2)
3. WASHER (2)
4. COTTER PIN (2)
5. SPRING (2)
6. PLATE (2)
7. BRAKE SPRING (2)
8. SHOE (2)
9. RETAINER (2)
10. SPRING (2)
11. SPRING (2)
12. ADJUSTMENT BOLT (2)
13. ANCHOR (2)
14. PLUNGER (2)
15. RETAINER (2)
16. SEAL (2)
17. PLUNGER (2)
18. SNAP RING
19. WEDGE
20. SPIDER
21. PAWL
22. GUIDE
23. CAP
24. GUIDE
25. GUIDE (2)
26. LOCKPLATE (2)
27. DUST COVER (2)

TA 075676

9-33. REAR BRAKE SHOES MAINTENANCE (M915).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(15)
c. Installation.	(20)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
10-15A.	Hub and Drum removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

None.

TROUBLESHOOTING REFERENCES

9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

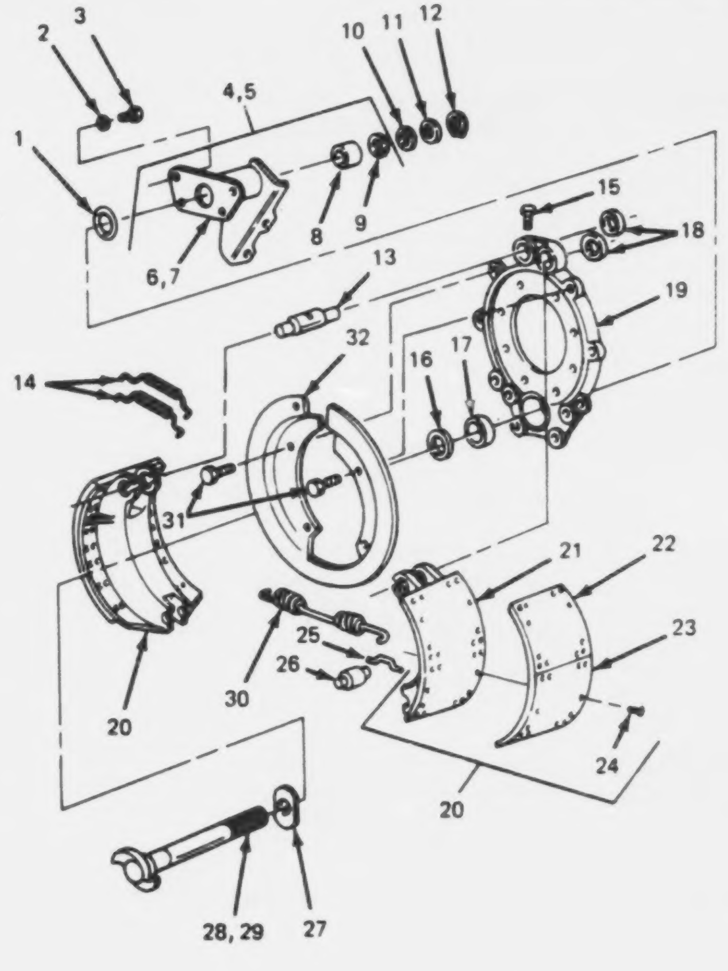
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral
Park Brake Set.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. GASKET
2. LOCKWASHER (4)
3. CAPSCREW (4)
4. BRACKET ASSEMBLY
5. BRACKET ASSEMBLY
6. BRACKET
7. BRACKET
8. BEARING
9. SEAL
10. WASHER (2)
11. WASHER
12. RETAINING RING
13. ANCHOR PIN (2)
14. SPRING (2)
15. LOCKSCREW (2)
16. SEAL
17. BEARING
18. BUSHING (2)
19. SPIDER
20. SHOE ASSEMBLY (2)
21. SHOE (2)
22. LINING
23. LINING
24. RIVET
25. PIN (2)
26. ROLLER (2)
27. WASHER
28. CAMSHAFT, RH
29. CAMSHAFT, LH
30. SPRING
31. CAPSCREW (4)
32. DUST SHIELD

TA 075677

BRAKE SYSTEM.

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. RH and LH camshafts (28) and (29).	Back off on slack adjuster until camshafts (28) and (29) are in fully released position.	
2. Two shoe assemblies (20) and two rollers (26).	With a pry bar, pry up on shoe assemblies (20) and pull out rollers (26).	
3. Spring (30) and two pins (25).	Remove.	
4. Two springs (14).	Tilt shoe assemblies (20) out 180 degrees to release springs (14) and remove.	
5. Two lock screws (15) and two anchor pins (13).	Cut lock wire and loosen lock screw (15) to remove anchor pin (13) and shoe assemblies (20).	
B. INSPECTION.		
6. Camshafts (28) and (29), bearings (17) and (8), and two bushings (18).	Inspect for excessive wear and looseness in bearings (17), bushing (18), and bearing (8).	
7. Two shoe assemblies (20).	Inspect for wear or damage and replace as necessary.	If linings (22) and (23) are to be serviced separately, refer to Direct Support Maintenance as rivets (24) will have to be drilled out of linings and shoes (21).

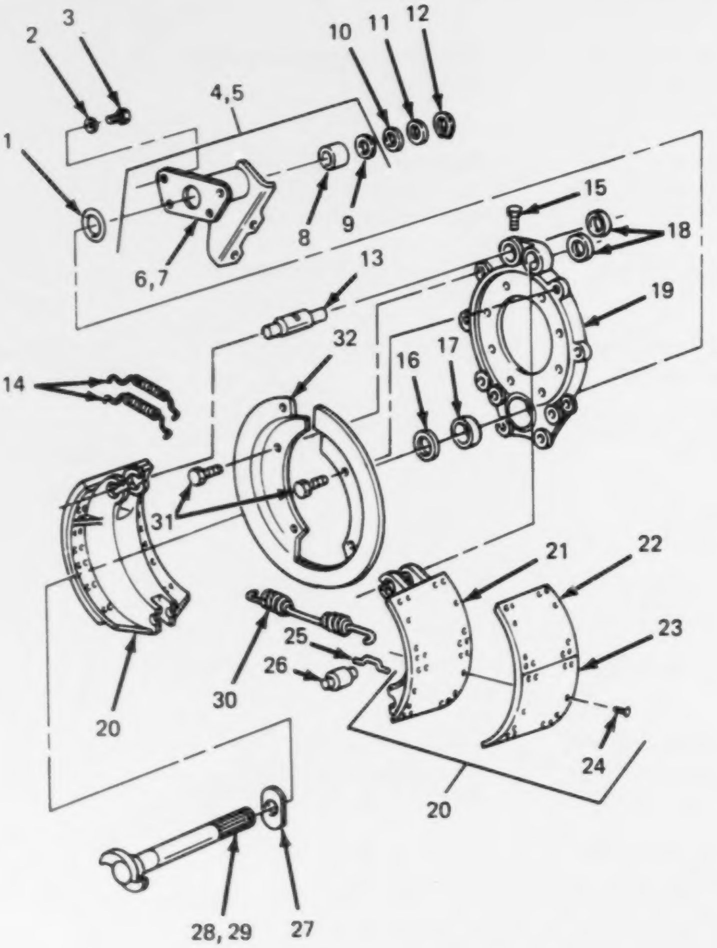
NOTE

Perform steps 8 thru 14 only if excessive wear has been found.

LOCATION/ITEM	ACTION	REMARKS
8. Retaining ring (12) and washer (11).	Remove.	
9. Slack adjuster.	Remove (refer to para 9-39A and B).	

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. GASKET
2. LOCKWASHER (4)
3. CAPSCREW (4)
4. BRACKET ASSEMBLY
5. BRACKET ASSEMBLY
6. BRACKET
7. BRACKET
8. BEARING
9. SEAL
10. WASHER (2)
11. WASHER
12. RETAINING RING
13. ANCHOR PIN (2)
14. SPRING (2)
15. LOCKSCREW (2)
16. SEAL
17. BEARING
18. BUSHING (2)
19. SPIDER
20. SHOE ASSEMBLY (2)
21. SHOE (2)
22. LINING
23. LINING
24. RIVET
25. PIN (2)
26. ROLLER (2)
27. WASHER
28. CAMSHAFT, RH
29. CAMSHAFT, LH
30. SPRING
31. CAPSCREW (4)
32. DUST SHIELD

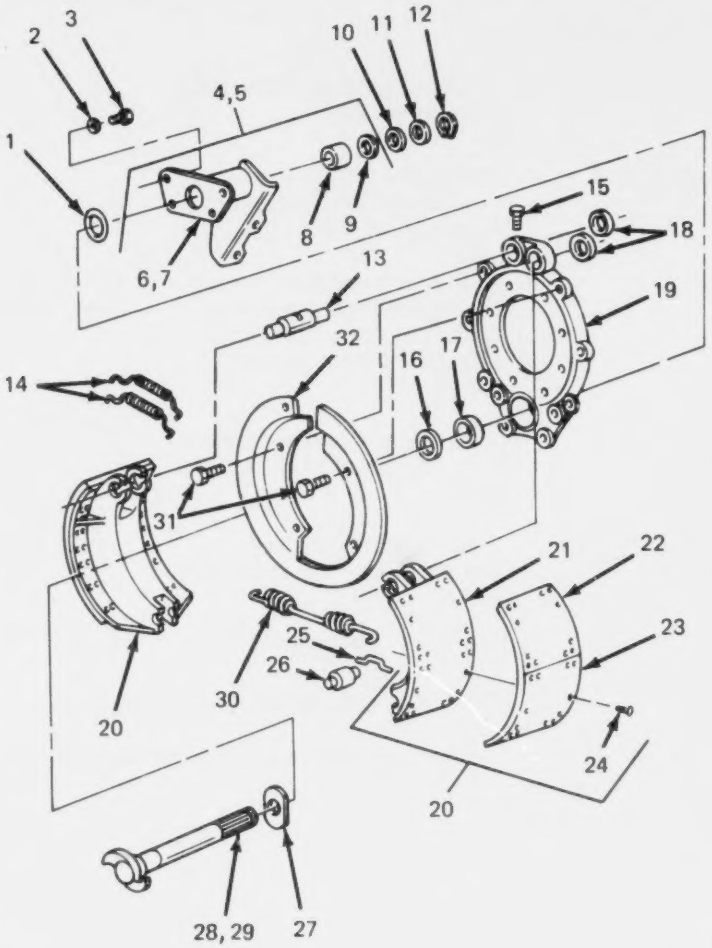
TA 075678

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION (Continued).		
10. Camshafts (28) and (29), two washers (10), and washer (27).	Remove by tapping gently from rear.	
11. Bracket assemblies (4) and (5) and gasket (1).	Remove by unscrewing four capscrews (3) with four lockwashers (2).	
12. Bearing (8) and seal (9).	Remove from brackets (6) and (7).	
13. Two bushings (18), seal (16), and bearing (17).	Remove from spider (19).	
14. Four capscrews (31) and dust shield (32).	Remove from spider (19).	Remove only if damaged or replacing spider.
C. INSTALLATION.		
15. Two bushings (18), seal (16), and bearing (17).	Push into spider (19).	
16. Bearing (8) and seal (9).	Insert into brackets (6) and (7).	
17. Bracket assemblies (4) and and (5) and gasket (1).	Install and secure with four capscrews (3) and lockwashers (2).	
18. Camshafts (28) and (29) and washer (27).	Install through bearings (17) and (8).	
19. Two shoe assemblies (20) and two anchor pins (13).	a. Install to spider (19) thru two bushings (18). b. Tighten lock screw (15) and install new lock wire.	

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS



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LEGEND:

1. GASKET
2. LOCKWASHER (4)
3. CAPSCREW (4)
4. BRACKET ASSEMBLY
5. BRACKET ASSEMBLY
6. BRACKET
7. BRACKET
8. BEARING
9. SEAL
10. WASHER (2)
11. WASHER
12. RETAINING RING
13. ANCHOR PIN (2)
14. SPRING (2)
15. LOCKSCREW (2)
16. SEAL
17. BEARING
18. BUSHING (2)
19. SPIDER
20. SHOE ASSEMBLY (2)
21. SHOE (2)
22. LINING
23. LINING
24. RIVET
25. PIN (2)
26. ROLLER (2)
27. WASHER
28. CAMSHAFT, RH
29. CAMSHAFT, LH
30. SPRING
31. CAPSCREW (4)
32. DUST SHIELD

TA 075679

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

C. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
20. Two springs (14).	Hook up springs (14) to shoe assemblies (20).	
21. Two pins (25) and spring (30).	Insert pins (25) into two shoe assemblies (20) and hook spring (30) in position.	
22. Two rollers (26).	With a long handled screwdriver, pry shoe assemblies (20) away from camshafts (28) and (29) and install rollers (26).	Repeat for opposite shoe to install rollers.
23. Dust shield (32) and four capscrews (31).	Install dust shield and secure with capscrews (31) to spider (19).	
24. Two washers (10) and (11), and retainer ring (12).	Install and adjust slack adjuster (refer to para 9-36A and B).	

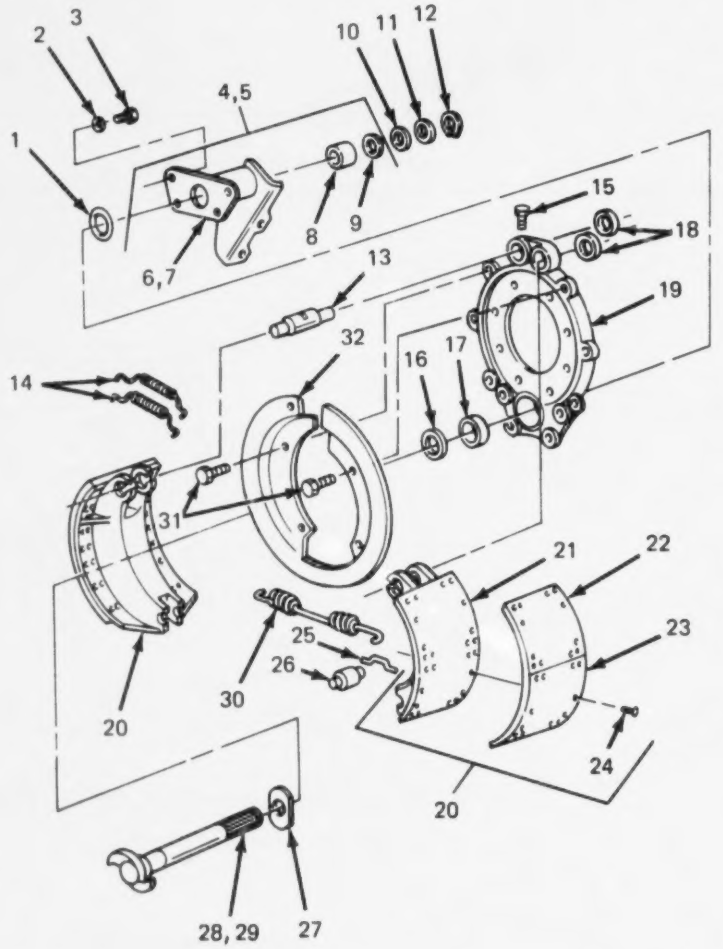
NOTE

Follow-on maintenance action required:

Install hub and drum (refer to para 10-15C).

9-33. REAR BRAKE SHOES MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. GASKET
2. LOCKWASHER (4)
3. CAPSCREW (4)
4. BRACKET ASSEMBLY
5. BRACKET ASSEMBLY
6. BRACKET
7. BRACKET
8. BEARING
9. SEAL
10. WASHER (2)
11. WASHER
12. RETAINING RING
13. ANCHOR PIN (2)
14. SPRING (2)
15. LOCKSCREW (2)
16. SEAL
17. BEARING
18. BUSHING (2)
19. SPIDER
20. SHOE ASSEMBLY (2)
21. SHOE (2)
22. LINING
23. LINING
24. RIVET
25. PIN (2)
26. ROLLER (2)
27. WASHER
28. CAMSHAFT, RH
29. CAMSHAFT, LH
30. SPRING
31. CAPSCREW (4)
32. DUST SHIELD

TA 075680

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(15)
c. Installation.	(20)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Snap Ring Pliers.
Brake Spring Pliers.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
10-14A.	Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

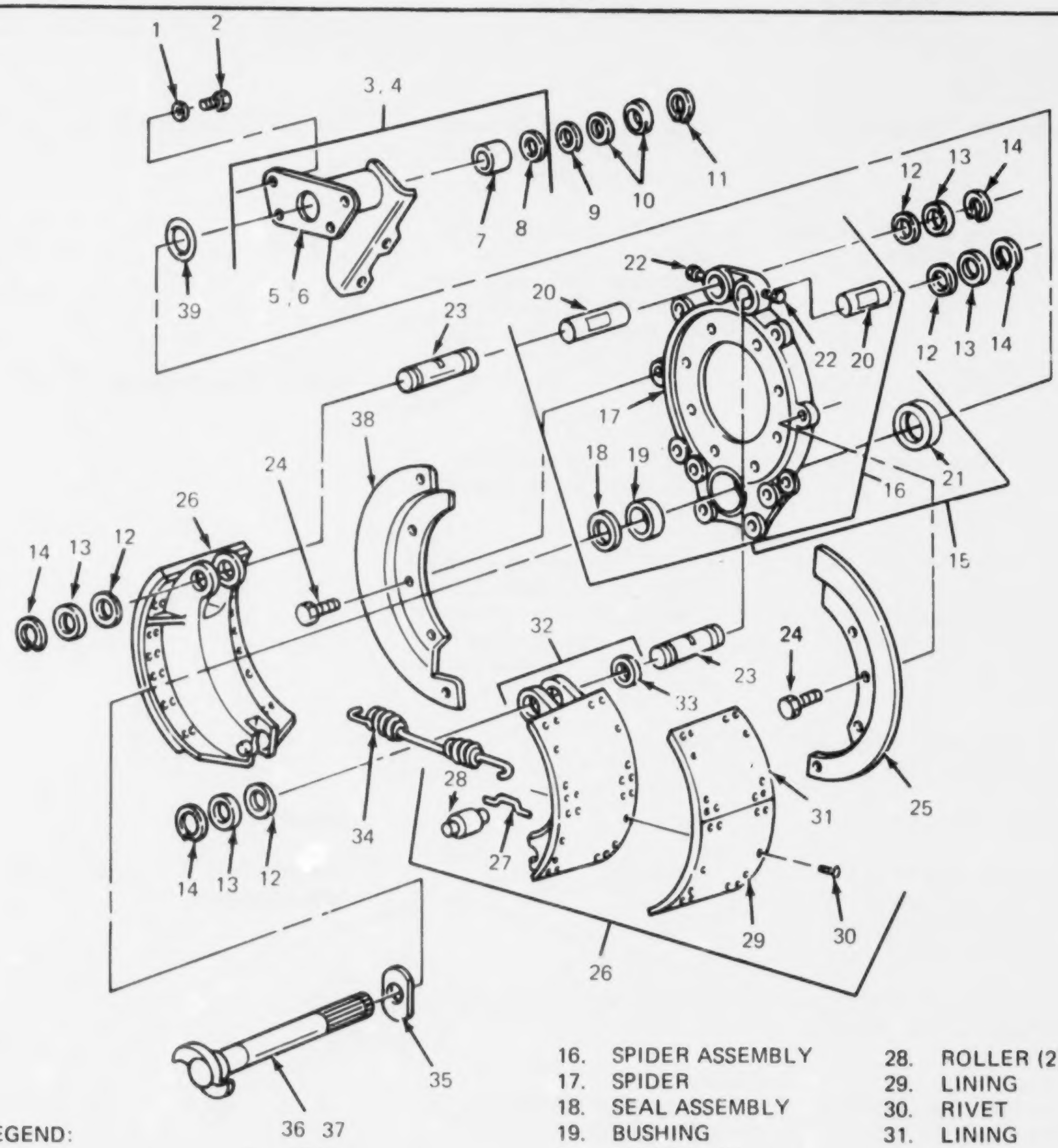
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. WASHER (4)
2. CAPSCREW (4)
3. BRACKET, LH
4. BRACKET, RH
5. BRACKET, LH
6. BRACKET, RH
7. BUSHING
8. SEAL
9. WASHER
10. WASHER (2)
11. RETAINING RING
12. FELT RING (4)
13. RETAINER (4)
14. RETAINER RING (4)
15. SPIDER ASSEMBLY
16. SPIDER ASSEMBLY
17. SPIDER
18. SEAL ASSEMBLY
19. BUSHING
20. BUSHING (2)
21. SEAL
22. LOCK BOLT (2)
23. ANCHOR PIN (2)
24. CAPSCREW (6)
25. DUST SHIELD
26. SHOE ASSEMBLY (2)
27. PIN (2)
28. ROLLER (2)
29. LINING
30. RIVET
31. LINING
32. SHOE
33. BUSHING
34. SPRING
35. WASHER
36. CAMSHAFT, RH
37. CAMSHAFT, LH
38. DUST SHIELD
39. GASKET

TA 075681

BRAKE SYSTEM.

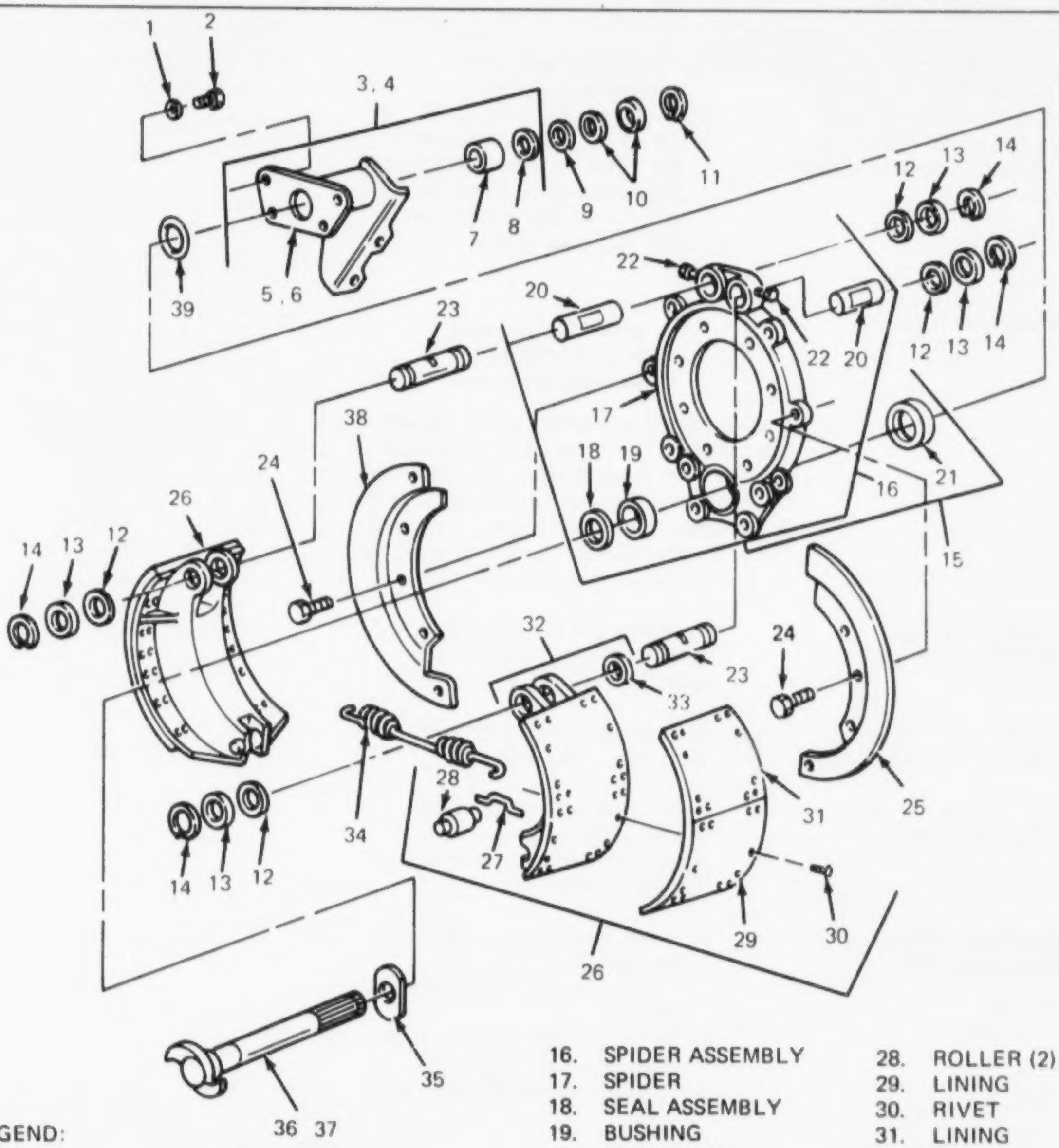
9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Camshafts (36) and (37).	Back off on slack adjuster until camshafts are in the released position.	See para 9-39A and B.
2. Two brake shoe assemblies (26) and two rollers (28).	With a long handle screwdriver pry brake shoe assemblies (26) away from camshafts (36) and (37), then remove rollers (28).	
3. Spring (34) and two pins (27).	Remove.	Use brake spring pliers.
4. Two retainer rings (14), two retainers (13), and two felt rings (12).	Remove from rear using snapring pliers on retainer rings (14).	
5. Two lockbolts (22), two anchor pins (23), two retainer rings (14), two retainers (13), and two felt rings (12).	a. Cut lock wire and remove. b. Loosen lock bolts (22) and pull anchor pins (23) out of retainer rings (14), retainers (13) and felt rings (12) from front.	
6. Two shoe assemblies (26) and bushings (33).	Remove.	
7. Two bushings (20).	Remove.	Inspect for wear.
8. Retaining ring (11), two washers (10), washer (9), and camshafts (36) and (37) and washer (35).	Remove.	Remove only if excessive looseness is evident.
9. Four capscrews (2), four washers (1), and brackets (3) and (4).	Remove with gasket (39).	
10. Two bushings (7) and seals (8).	Remove from brackets (5) and (6).	
11. Seal assembly (18), bushing (19), and seal (21).	Remove.	Replace only if excessive wear is evident.
12. Six capscrews (24).	Unscrew and remove dust shields (25) and (38).	
13. Spider (17).	Replace only if broken or damaged.	

BRAKE SYSTEM.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. WASHER (4)
2. CAPSCREW (4)
3. BRACKET, LH
4. BRACKET, RH
5. BRACKET, LH
6. BRACKET, RH
7. BUSHING
8. SEAL
9. WASHER
10. WASHER (2)
11. RETAINING RING
12. FELT RING (4)
13. RETAINER (4)
14. RETAINER RING (4)
15. SPIDER ASSEMBLY
16. SPIDER ASSEMBLY
17. SPIDER
18. SEAL ASSEMBLY
19. BUSHING
20. BUSHING (2)
21. SEAL
22. LOCK BOLT (2)
23. ANCHOR PIN (2)
24. CAPSCREW (6)
25. DUST SHIELD
26. SHOE ASSEMBLY (2)
27. PIN (2)
28. ROLLER (2)
29. LINING
30. RIVET
31. LINING
32. SHOE
33. BUSHING
34. SPRING
35. WASHER
36. CAMSHAFT, RH
37. CAMSHAFT, LH
38. DUST SHIELD
39.* GASKET

TA 075682

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

B. INSPECTION.

LOCATION/ITEM	ACTION	REMARKS
14. Gasket (39), seals (8), (18), and (21), bushings (7), (19), (20) and (23), and camshafts (36) and (37), and shoe assemblies (26).	a. Inspect for wear and replace as needed. b. If linings (29) and (31) are to be serviced separately, refer to Direct Support Maintenance as rivets (30) will have to be drilled out and replaced with new.	

C. INSTALLATION.

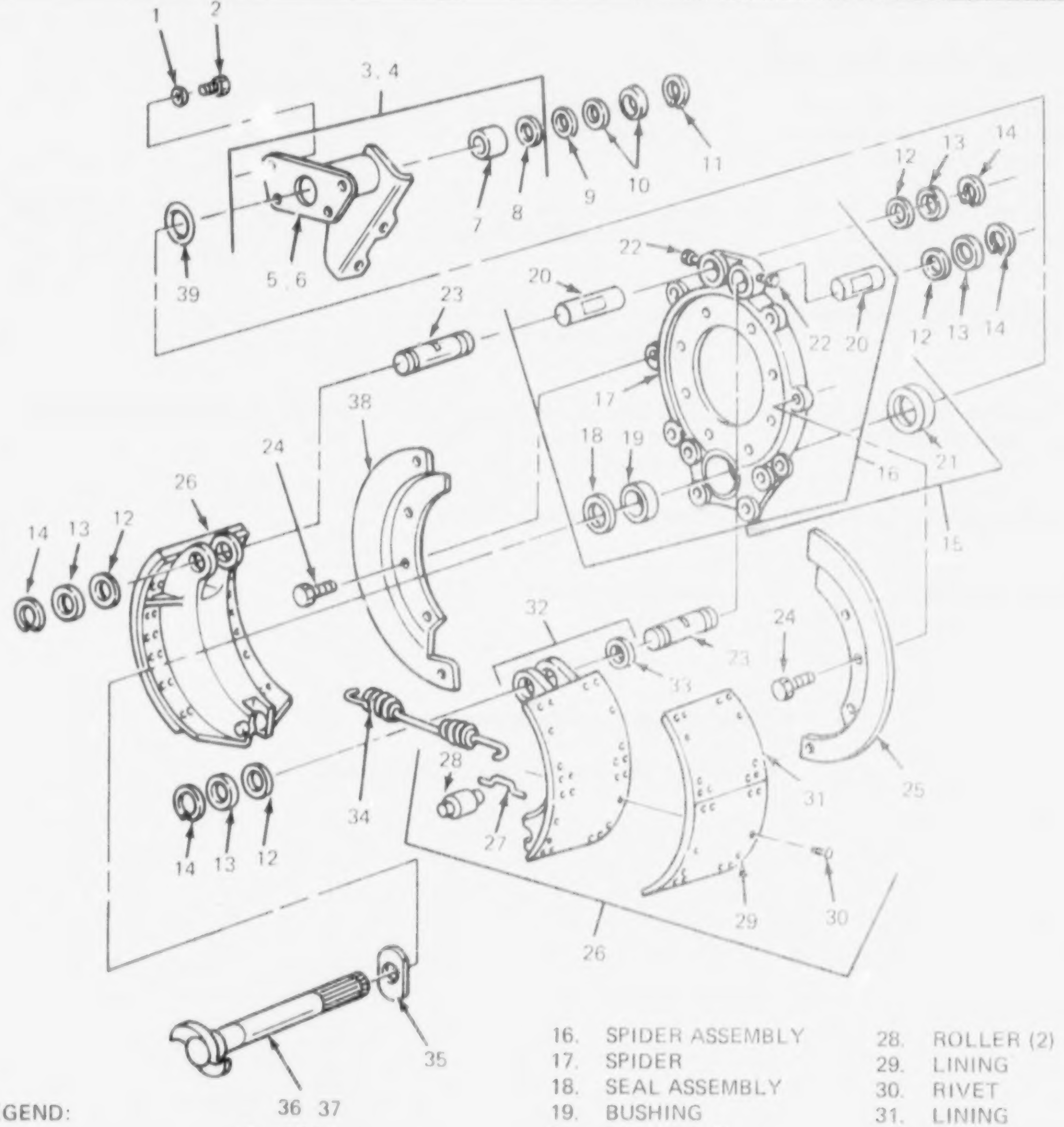
CAUTION

If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.

LOCATION/ITEM	ACTION	REMARKS
15. Bushing (19), seal assembly (18), and seal (21).	Push seal (21) in place then bushing (19), and seal assembly (18).	
16. Brackets (5) and (6), bushing (7) and seal (8).	Push bushing (7) into place then install seal (8).	
17. Brackets (3) and (4), and gasket (39).	Install one gasket (39) into brackets (3) and (4) and secure with four capscrews (2) and washers (1).	
18. Camshafts (36) and (37) and washer (35).	a. Install one washer (35) on on each camshaft and install through bushings (19) and (7). b. Install washers (9) and (10) then retaining ring (11). c. Position two shoe assemblies (26).	
19. Two anchor pins (23) and two bushings (20).	a. Install anchor pins (23) through shoe assemblies (26). b. Install bushings (20) into spider (17). c. Tighten lock bolt (22) and install lockwire.	

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. WASHER (4)
2. CAPSCREW (4)
3. BRACKET, LH
4. BRACKET, RH
5. BRACKET, LH
6. BRACKET, RH
7. BUSHING
8. SEAL
9. WASHER
10. WASHER (2)
11. RETAINING RING
12. FELT RING (4)
13. RETAINER (4)
14. RETAINER RING (4)
15. SPIDER ASSEMBLY
16. SPIDER ASSEMBLY
17. SPIDER
18. SEAL ASSEMBLY
19. BUSHING
20. BUSHING (2)
21. SEAL
22. LOCK BOLT (2)
23. ANCHOR PIN (2)
24. CAPSCREW (6)
25. DUST SHIELD
26. SHOE ASSEMBLY (2)
27. PIN (2)
28. ROLLER (2)
29. LINING
30. RIVET
31. LINING
32. SHOE
33. BUSHING
34. SPRING
35. WASHER
36. CAMSHAFT, RH
37. CAMSHAFT, LH
38. DUST SHIELD
39. GASKET

TA 075683

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
20. Two felt rings (12), two retainers (13), and two retainer rings (14).	Slide onto anchor pins (23) from rear.	
21. Two felt rings (12), two retainers (13), and two retainer rings (14).	Install on anchor pin (23) from front side and secure.	Use snap ring pliers on retainer rings (14).
22. Two pins (27), and spring (34).	Install pins (27) and hook on spring (34) with brake spring pliers.	
23. Two shoe assemblies (26) and two rollers (28).	With long screwdriver pry up on shoe assembly (26) and install roller (28).	Repeat operation for opposite shoe.
24. Dust shields (25) and (38).	Install with six capscrews (24).	
25. Slack adjusters.	Adjust (see para 9-39A and B).	

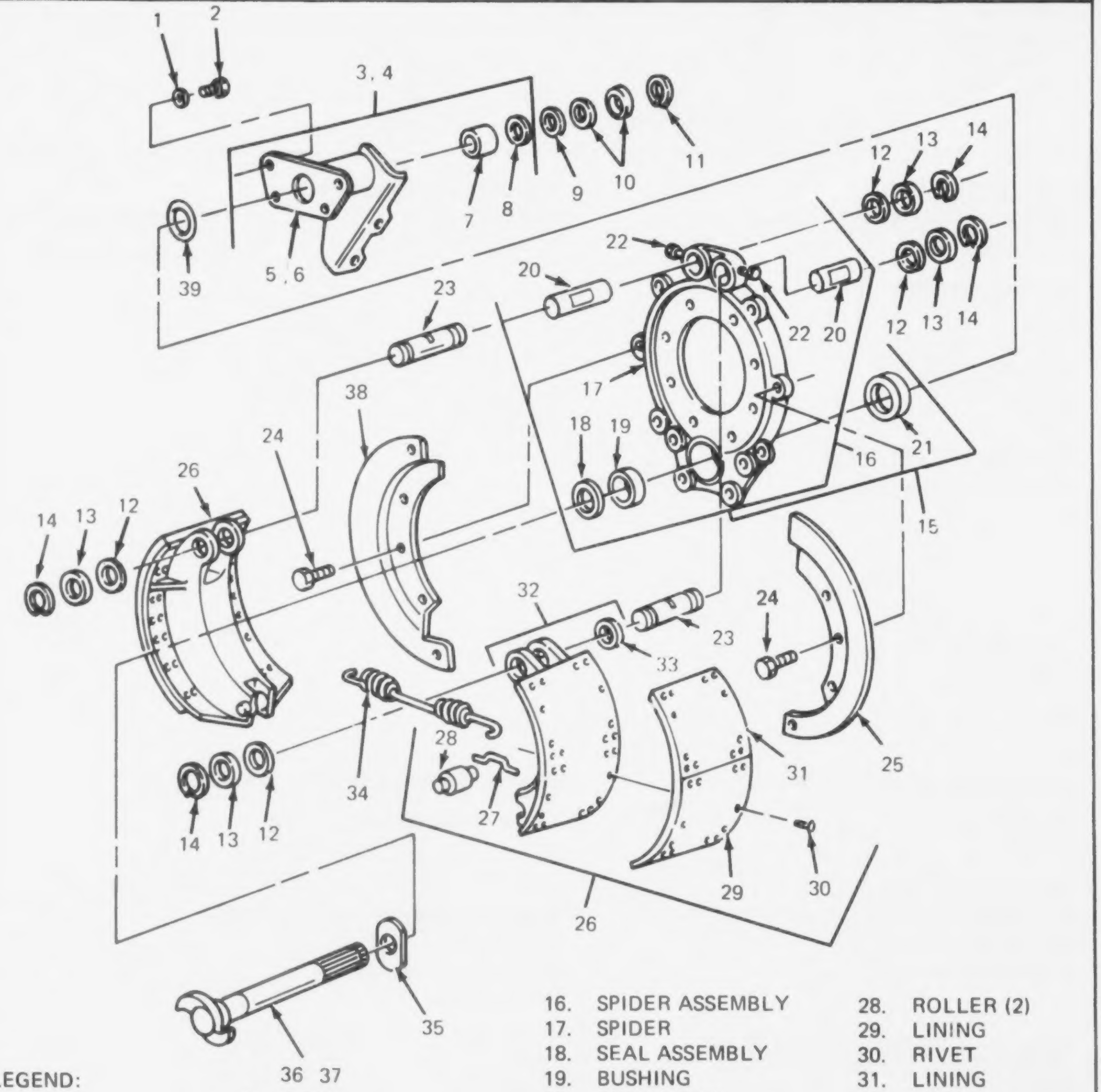
NOTE

Follow-on maintenance action required:

Install hub and drum; refer to para 10-14C.

9-34. REAR BRAKE SHOES MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. WASHER (4)
2. CAPSCREW (4)
3. BRACKET, LH
4. BRACKET, RH
5. BRACKET, LH
6. BRACKET, RH
7. BUSHING
8. SEAL
9. WASHER
10. WASHER (2)
11. RETAINING RING
12. FELT RING (4)
13. RETAINER (4)
14. RETAINER RING (4)
15. SPIDER ASSEMBLY
16. SPIDER ASSEMBLY
17. SPIDER
18. SEAL ASSEMBLY
19. BUSHING
20. BUSHING (2)
21. SEAL
22. LOCK BOLT (2)
23. ANCHOR PIN (2)
24. CAPSCREW (6)
25. DUST SHIELD
26. SHOE ASSEMBLY (2)
27. PIN (2)
28. ROLLER (2)
29. LINING
30. RIVET
31. LINING
32. SHOE
33. BUSHING
34. SPRING
35. WASHER
36. CAMSHAFT, RH
37. CAMSHAFT, LH
38. DUST SHIELD
39. GASKET

TA 075684

BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection.	(5)
c. Installation.	(15)
d. Adjustment.	(15)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
10-16A.	Hub and Drum Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

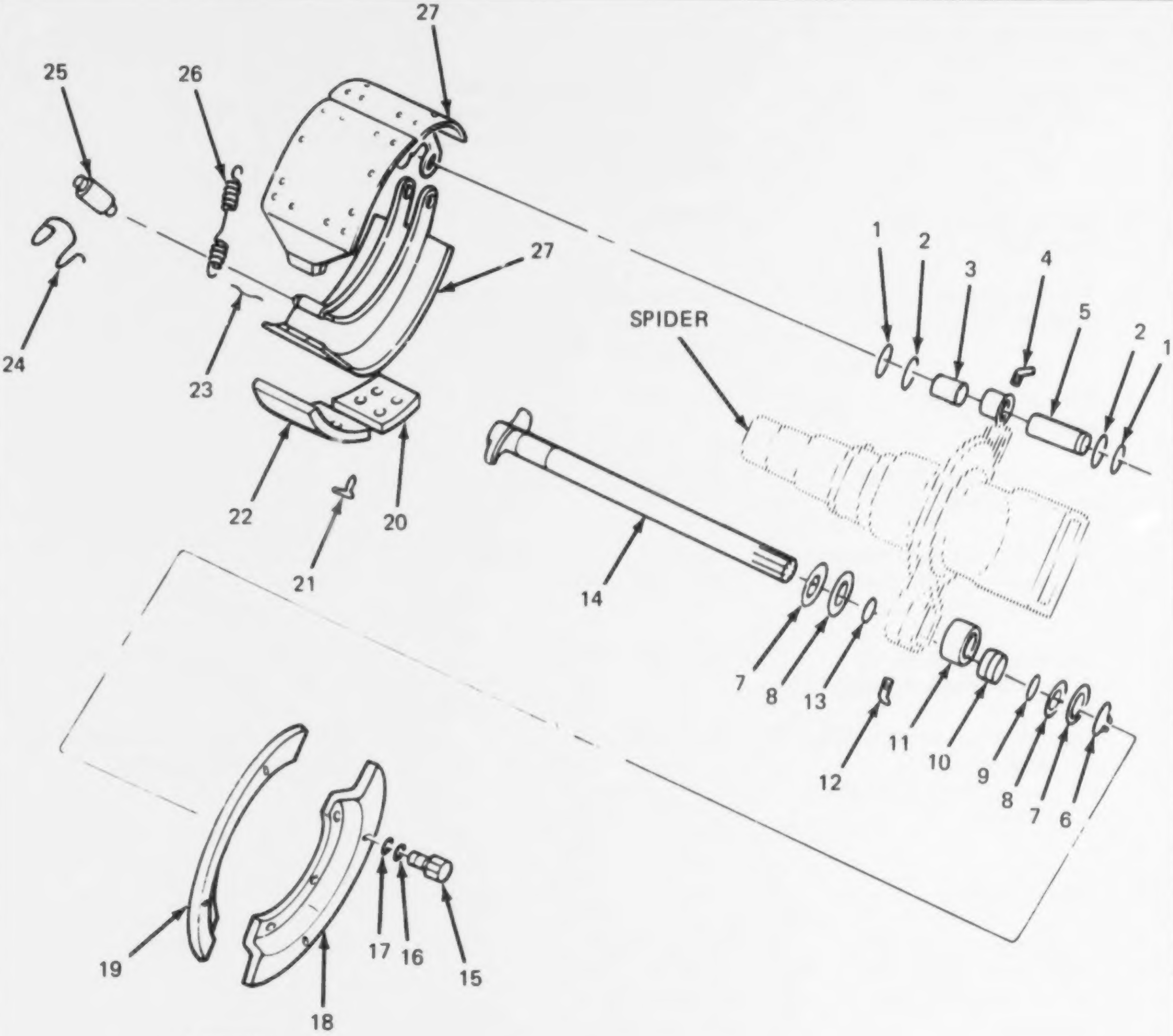
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


27
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SPIDER
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LEGEND:

1. SNAP RING (4)
2. WASHER (4)
3. BUSHING (2)
4. GREASE FITTING
5. PIN (2)
6. SNAP RING
7. WASHER (2)
8. SEAL (2)
9. O-RING
10. BUSHING
11. BUSHING
12. GREASE FITTING
13. O-RING
14. CAMSHAFT
15. CAPSCREW (6)
16. LOCKWASHER (6)
17. WASHER (6)
18. DUST SHIELD
19. DUST SHIELD
20. LINING
21. RIVET
22. LINING
23. PIN (2)
24. RETAINER (2)
25. ROLLER (2)
26. SPRING
27. BRAKE SHOE ASSEMBLY (2)

TA 075685

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

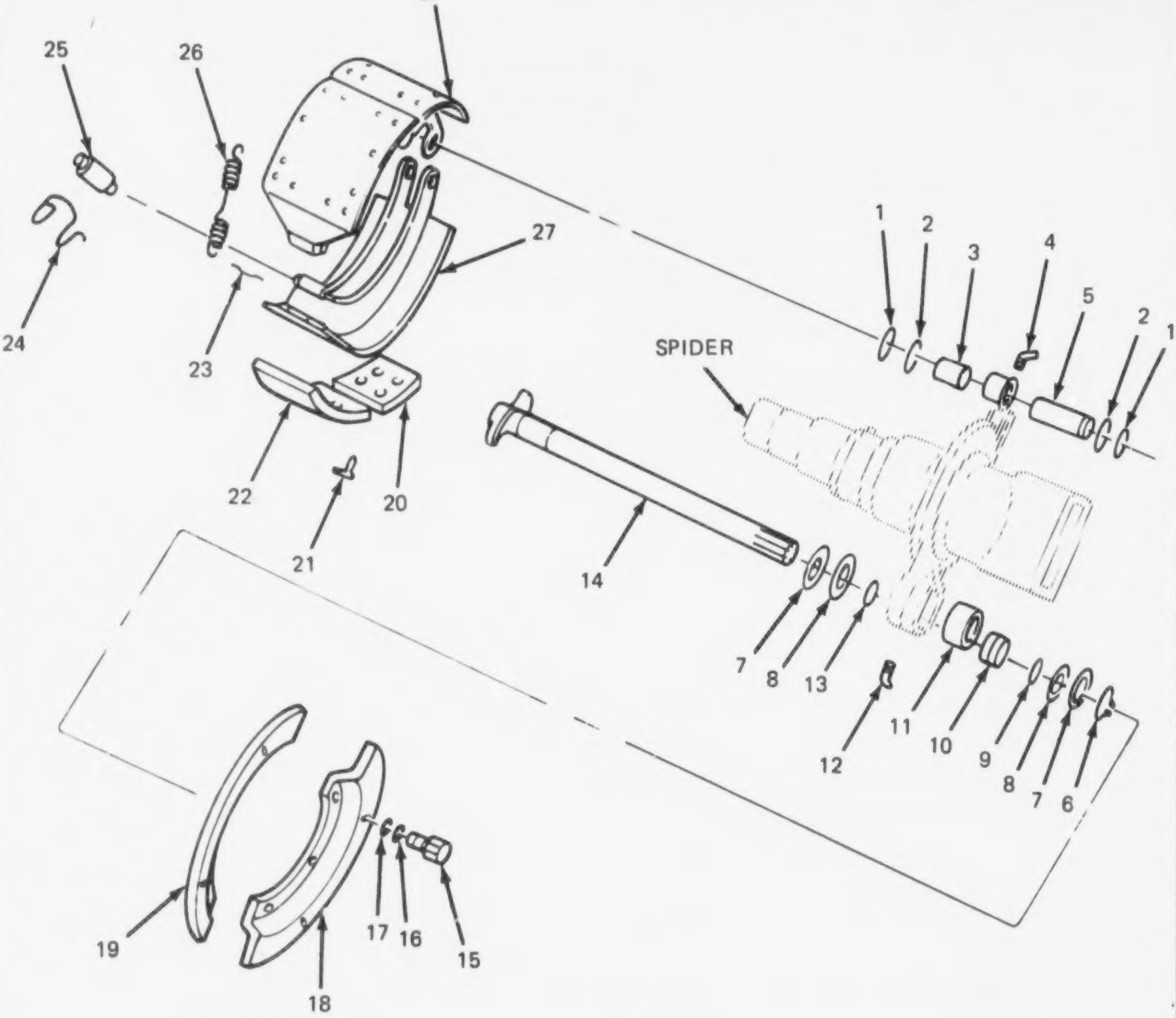
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two brake shoe assemblies (27).	With a long handle screwdriver lift brake shoe assemblies and remove two rollers (25) and retainers (24).	
2. Spring (26) and two pins (23).	Remove.	
3. Four snap rings (1), four washers (2) and two pins (5).	From rear side remove snap ring (1) and washer (2), then pull out pin (5).	
4. Two brake shoe assemblies (27).	Lift off.	
5. Two bushings (3) and grease fittings (4).	Remove.	
6. Snap ring (6), two washers (7), two seals (8), O-ring (9), and O-ring (13).	Remove and pull camshaft (14) out of spider.	
7. Bushing (10), bushing (11), and grease fitting (12).	Remove.	
8. Dust shield (18) and (19), six capscrews (15), six lockwashers (16), and six washers (17).	Remove.	Remove only if damaged and replacement is needed.
B. INSPECTION.		
9. Brake spring (26), shoe assemblies (27), O-ring (9), O-ring (13) and all hardware.	Inspect for: a. Dirt. b. Wear. c. Damage	Replace as necessary.

NOTE

If lining (22) is to be replaced separately, rivets (21) will have to be drilled out and replaced with new. Refer to Direct Support Maintenance.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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SPIDER
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18

LEGEND:

1. SNAP RING (4)
2. WASHER (4)
3. BUSHING (2)
4. GREASE FITTING
5. PIN (2)
6. SNAP RING
7. WASHER (2)
8. SEAL (2)
9. O-RING
10. BUSHING
11. BUSHING
12. GREASE FITTING
13. O-RING
14. CAMSHAFT
15. CAPSCREW (6)
16. LOCKWASHER (6)
17. WASHER (6)
18. DUST SHIELD
19. DUST SHIELD
20. LINING
21. RIVET
22. LINING
23. PIN (2)
24. RETAINER (2)
25. ROLLER (2)
26. SPRING
27. BRAKE SHOE ASSEMBLY (2)

TA 075686

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

C. INSTALLATION.

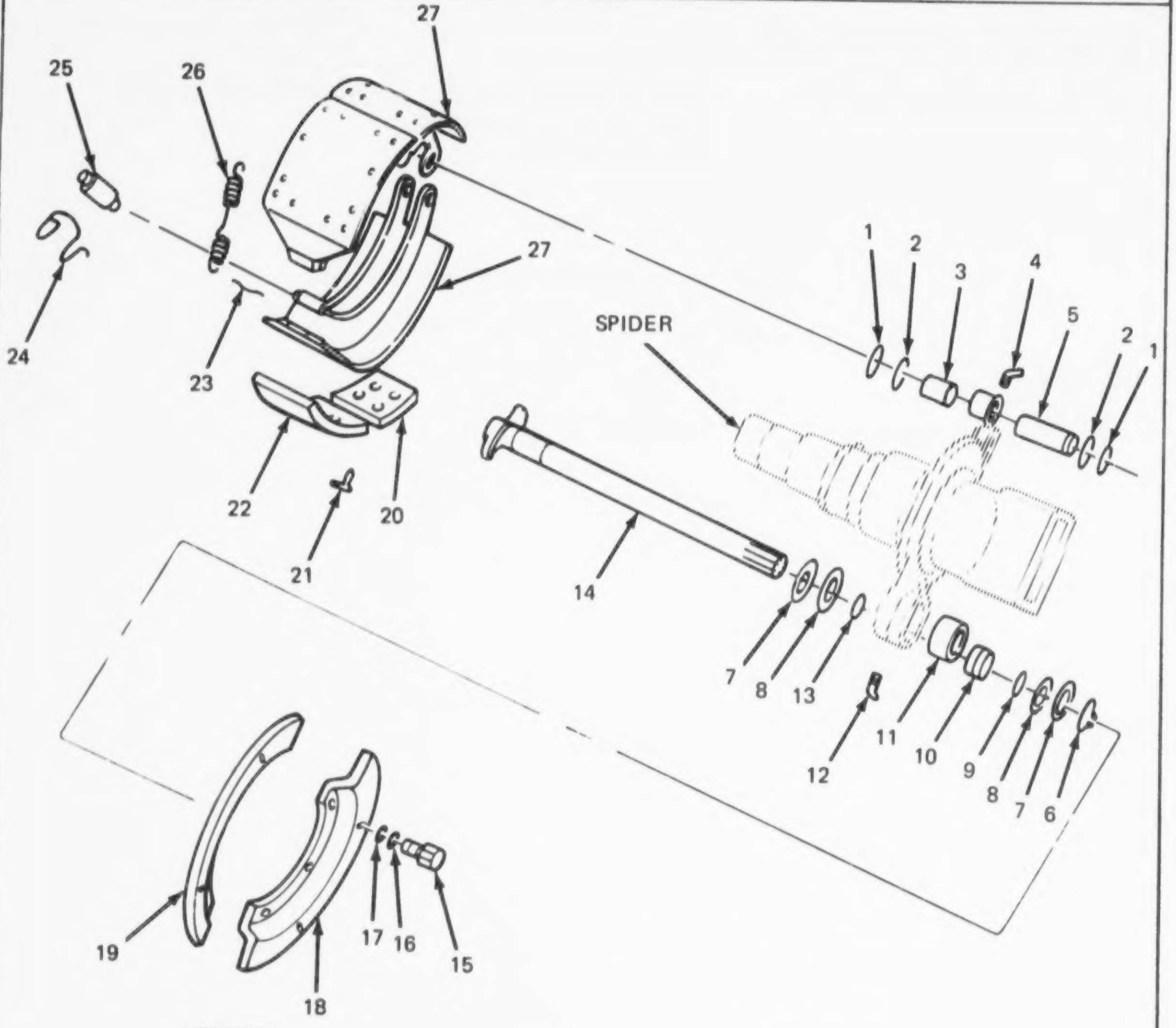
CAUTION

If you replace any brake shoe, replace all the shoes on that axle. A combination of new and old shoes on the same axle will cause uneven braking. Make sure that the brake shoes are clean before you install them. Be careful not to get grease or oil on the linings as you assemble them.

LOCATION/ITEM	ACTION	REMARKS
10. O-ring (13), seal (8), washer (7), and camshaft (14).	Install bushings (10) and (11), O-ring (13), seal (8), washer (7), and then install camshaft (14) thru bushings (10) and (11).	
11. O-ring (9), seal (8), washer (7), snap ring (6), and grease fitting (12).	Install.	
12. Two bushings (3) and grease fitting (4).	Install into spider.	
13. Two brake shoe assemblies (27).	Place on spider.	
14. Two pins (5), two washers (2) and two snap rings (1).	Install snap ring (1) on pin (5) with washer (2) and push through brake shoe assembly (27) and bushing (3).	
15. Two washers (2) and two snap rings (1).	Install washer (2) on back side of pin (5) and install snap ring (1).	
16. Spring (26) and two pins (23).	Install pins (23) and hook up spring (26).	
17. Two rollers (25) and two retainers (24).	With long handle screwdriver raise brake shoe to allow room to install roller (25) and retainer (24).	Repeat operation for opposite shoe.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


27
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SPIDER
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18

LEGEND:

1. SNAP RING (4)
2. WASHER (4)
3. BUSHING (2)
4. GREASE FITTING
5. PIN (2)
6. SNAP RING
7. WASHER (2)
8. SEAL (2)
9. O-RING
10. BUSHING
11. BUSHING
12. GREASE FITTING
13. O-RING
14. CAMSHAFT
15. CAPSCREW (6)
16. LOCKWASHER (6)
17. WASHER (6)
18. DUST SHIELD
19. DUST SHIELD
20. LINING
21. RIVET
22. LINING
23. PIN (2)
24. RETAINER (2)
25. ROLLER (2)
26. SPRING
27. BRAKE SHOE ASSEMBLY (2)

TA 075687

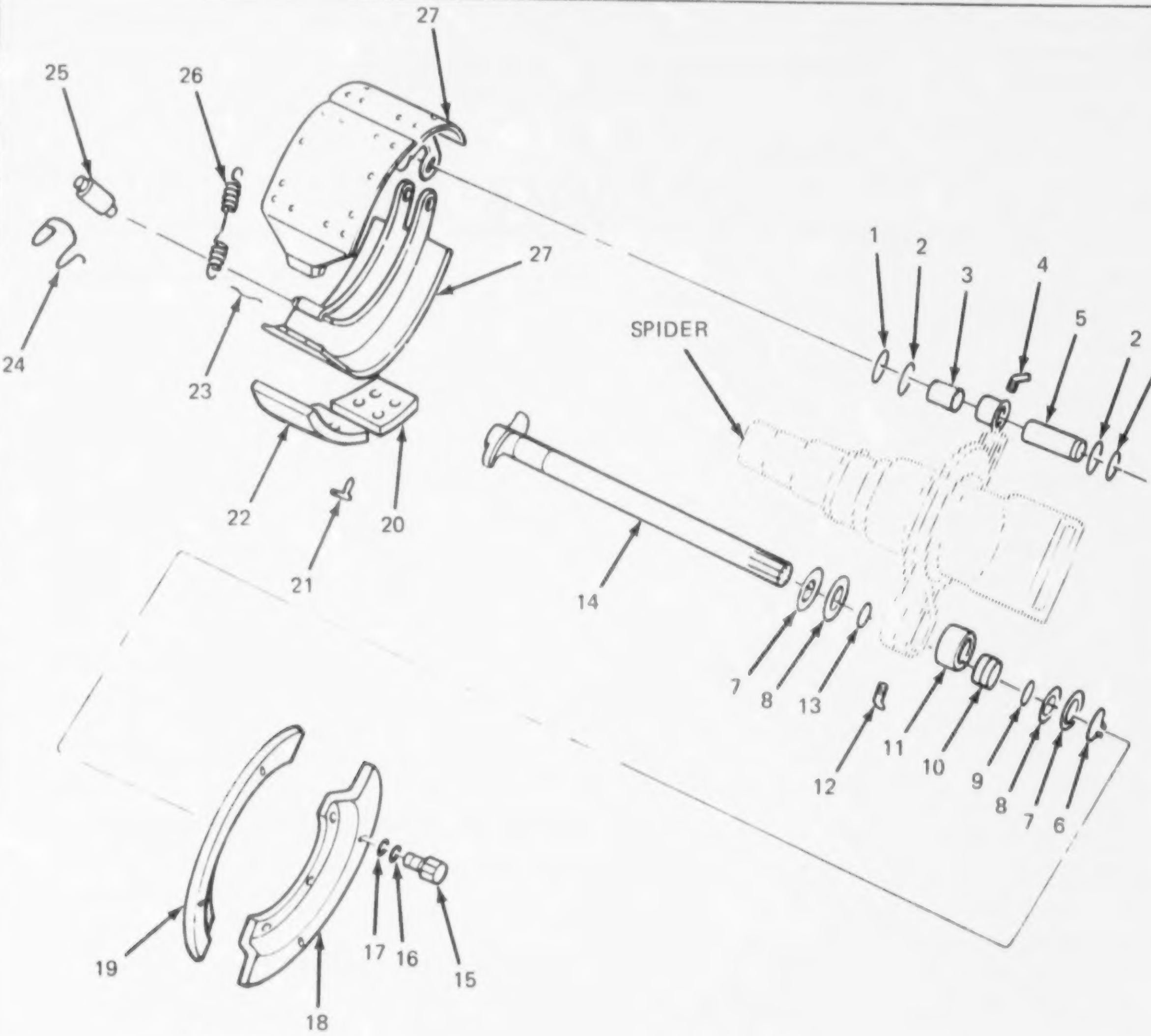
BRAKE SYSTEM.

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
18. Dust shields (18) and (19).	Install and secure with six capscrews (15), lockwashers (16), and washers (17).	If previously removed.
	NOTE Follow-on maintenance action required: Install hub and drum; refer to para 10-16C.	
D. ADJUSTMENT.		
19. Adjust slack adjuster.	See para 9-39.	

9-35. PUSHER AXLE BRAKE SHOES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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SPIDER
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18

LEGEND:

1. SNAP RING (4)
2. WASHER (4)
3. BUSHING (2)
4. GREASE FITTING
5. PIN (2)
6. SNAP RING
7. WASHER (2)
8. SEAL (2)
9. O-RING
10. BUSHING
11. BUSHING
12. GREASE FITTING
13. O-RING
14. CAMSHAFT
15. CAPSCREW (6)
16. LOCKWASHER (6)
17. WASHER (6)
18. DUST SHIELD
19. DUST SHIELD
20. LINING
21. RIVET
22. LINING
23. PIN (2)
24. RETAINER (2)
25. ROLLER (2)
26. SPRING
27. BRAKE SHOE ASSEMBLY (2)

TA 075688

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(15)
b.	Disassembly.	(15)
c.	Reassembly.	(15)
d.	Installation.	(15)
e.	Operational Check.	(10)
		70 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

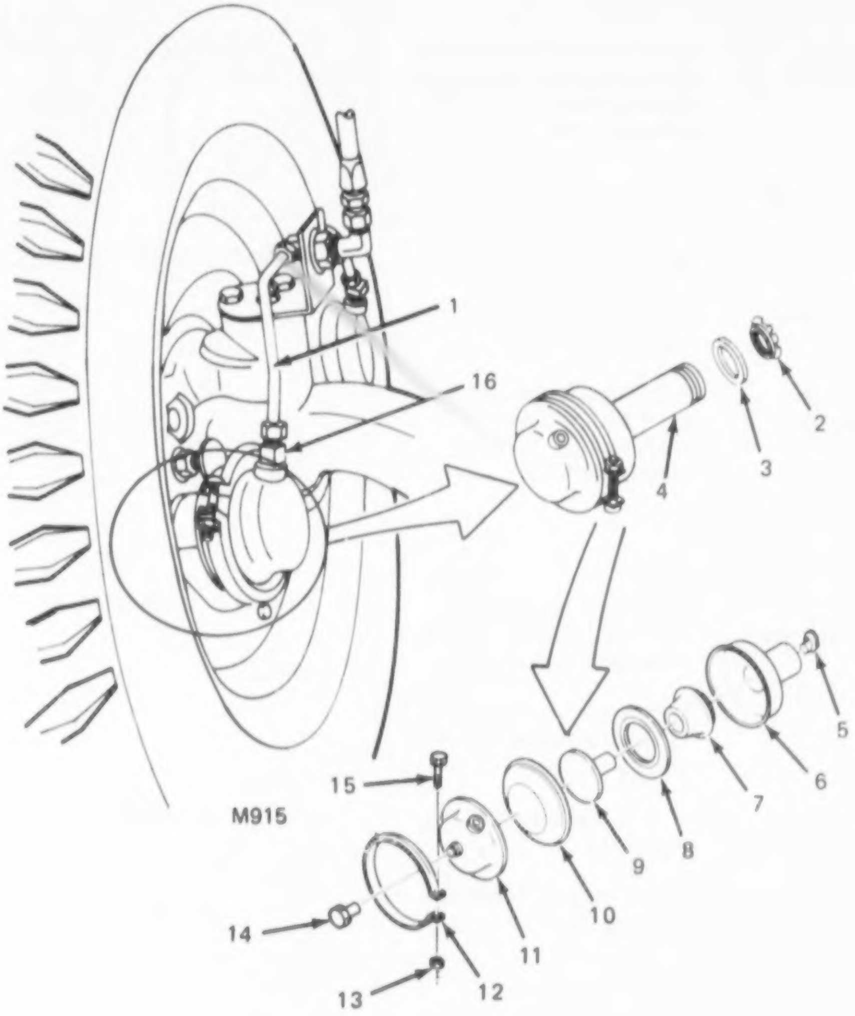
LOCATION/ITEM	ACTION	REMARKS

WARNING

Do not remove brake chamber until pressure is fully exhausted from all reservoirs.

NOTE

The M915 has two front brake air chambers per wheel, while the M916 thru M920 have one.



LEGEND:

1. AIR LINE
2. COLLET NUT
3. IDENTIFICATION RING
4. BRAKE CHAMBER ASSEMBLY
5. WEDGE GUIDE
6. NON-PRESSURE HOUSING
7. BOOT
8. RETAINER
9. PUSH ROD
10. DIAPHRAGM
11. PRESSURE HOUSING
12. CLAMP RING
13. CLAMP NUT
14. BRAKE PLUG
15. CLAMP BOLT
16. FITTING

TA 074942

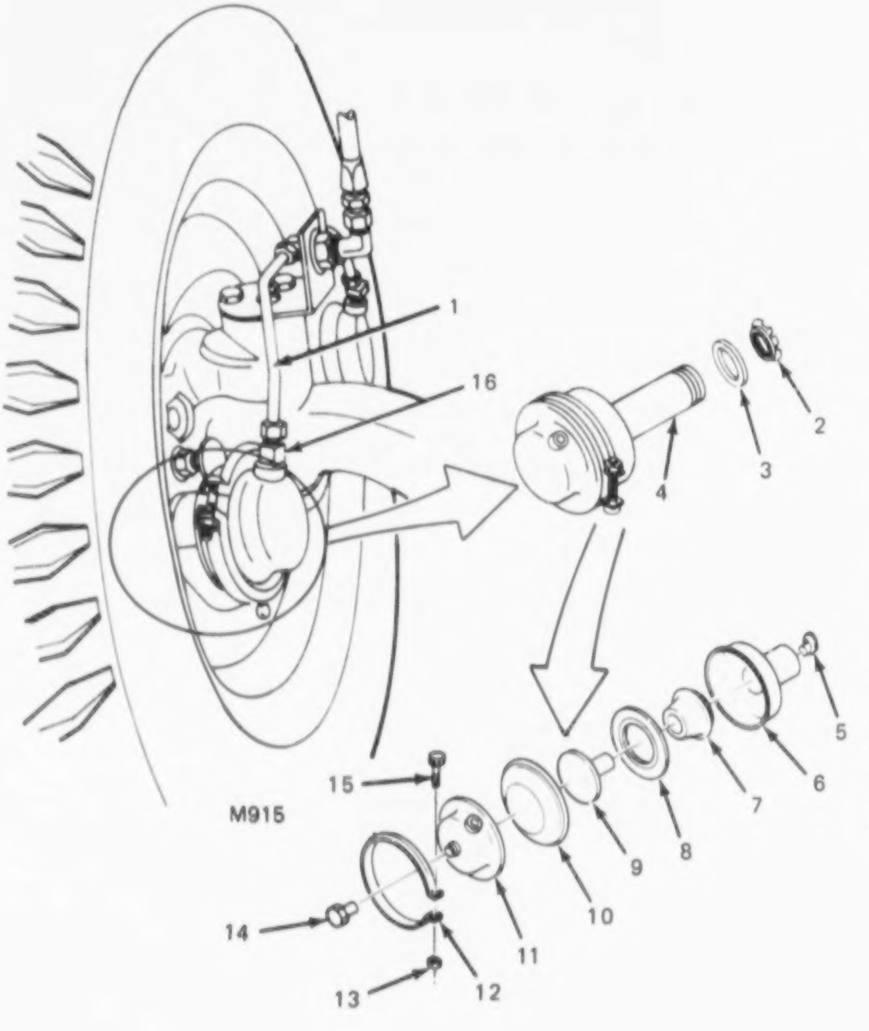
9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air line (1).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	Replace if necessary.
2. Collet nut (2).	Loosen.	M915 only.
3. Fitting (16).	Remove.	
4. Brake chamber assembly (4) and identification ring (3).	Unscrew and remove the brake chamber; the identification ring can also be removed now.	Be careful not to lose wedge guide (5).
B. DISASSEMBLY.		
5. Brake plug (14).	Remove.	M916 thru M920.
6. Clamp bolt (15) and clamp nut (13).	Unscrew and remove clamp ring (12).	
7. Pressure housing (11) and non-pressure housing (6).	Pull apart for access to boot (7), retainer (8), push rod (9), and diaphragm (10).	
C. REASSEMBLY.		
8. Boot (7), retainer (8), push rod (9), and diaphragm (10).	Assemble within non-pressure housing (6) and pressure housing (11).	Be sure to assemble as illustrated.
9. Clamp ring (12).	Secure to housings (6) and (11) with clamp bolt (14) and clamp nut (13).	
10. Brake plug (14).	Install into pressure housing (11).	M916 thru M920.
11. Wedge guide (5).	Insert into non-pressure housing (6).	

BRAKE SYSTEM.

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. AIR LINE
2. COLLET NUT
3. IDENTIFICATION RING
4. BRAKE CHAMBER ASSEMBLY
5. WEDGE GUIDE
6. NON-PRESSURE HOUSING
7. BOOT
8. RETAINER
9. PUSH ROD
10. DIAPHRAGM
11. PRESSURE HOUSING
12. CLAMP RING
13. CLAMP NUT
14. BRAKE PLUG
15. CLAMP BOLT
16. FITTING

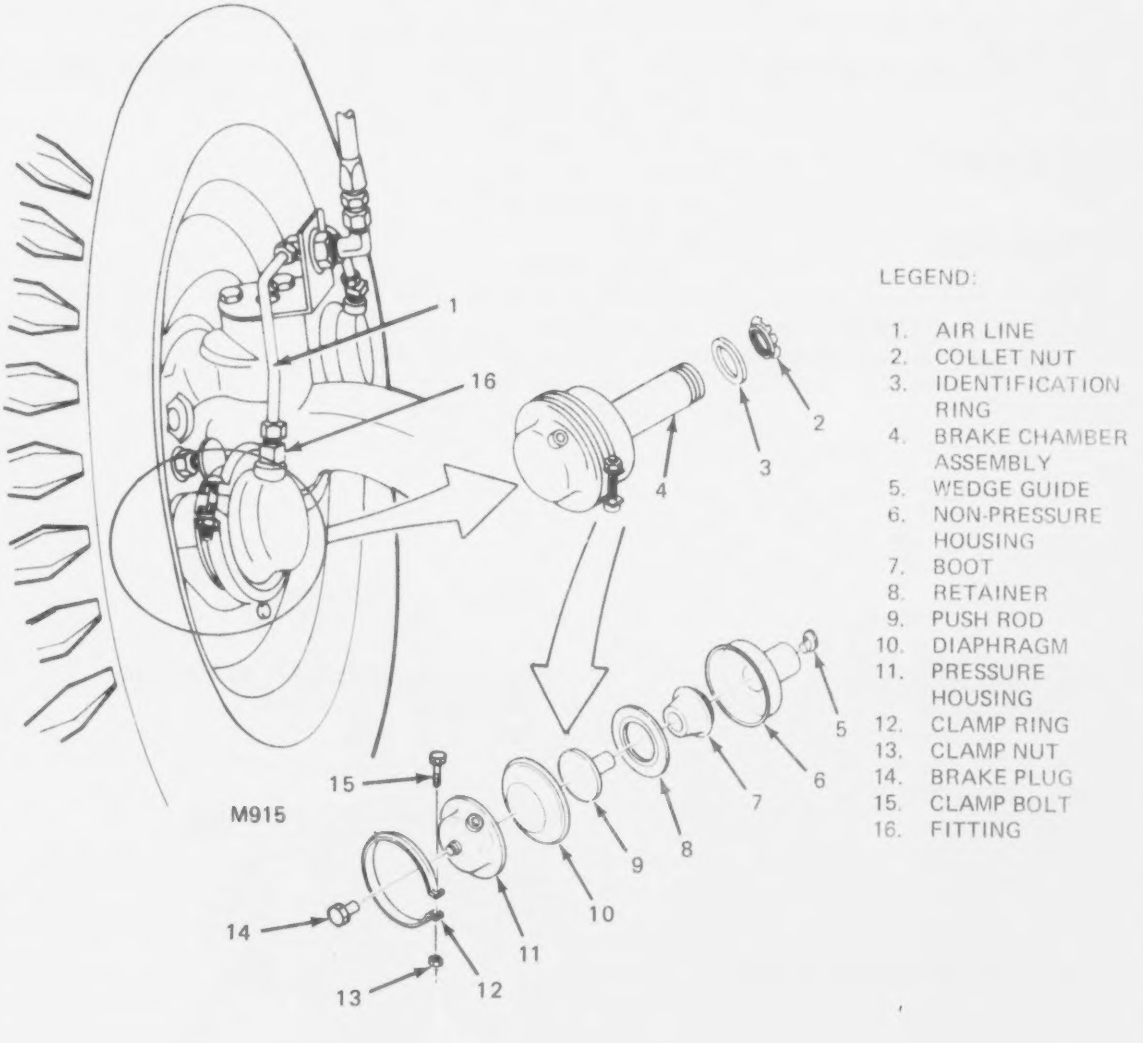
TA 075689

9-36. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION.		
12. Brake chamber assembly (4) and identification ring (3).	a. Slip identification ring (3) onto neck of brake chamber assembly (4). b. Screw on collet nut (2) and tighten. c. Screw brake chamber assembly (4) into wheel backing plate.	
13. Fitting (16).	a. Coat threads with liquid teflon. b. Screw into brake chamber assembly (4) and tighten.	
14. Air line (1).	a. Coat threads with liquid teflon. b. Screw into fitting (16) and tighten.	
E. OPERATIONAL CHECK.		
15. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (725-827 kPa).	
16. Cab/brake pedal.	Press down.	2nd mechanic.
17. Front brake air chamber assembly (4).	a. Check that brakes apply when pedal is pressed. b. Use soap solution to check for leaks.	1st mechanic.
18. Vehicle.	Road test. Check for proper braking.	
19. Engine.	Shut down (see TM 9-2320-273-10).	

9-32. FRONT BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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M915
LEGEND:
1. AIR LINE
2. COLLET NUT
3. IDENTIFICATION RING
4. BRAKE CHAMBER ASSEMBLY
5. WEDGE GUIDE
6. NON-PRESSURE HOUSING
7. BOOT
8. RETAINER
9. PUSH ROD
10. DIAPHRAGM
11. PRESSURE HOUSING
12. CLAMP RING
13. CLAMP NUT
14. BRAKE PLUG
15. CLAMP BOLT
16. FITTING

TA 075690

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Caging Power Spring.	(5)
b. Removal.	(20)
c. Installation	(25)
d. Uncaging Power Spring.	(10)
e. Operational check.	(2)
	62 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Wheels Blocked.
Transmission in Neutral.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

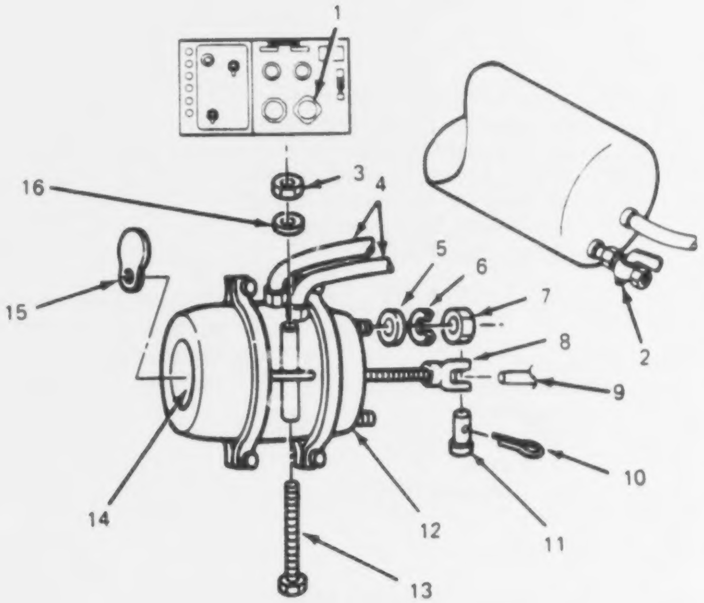
LOCATION/ITEM	ACTION	REMARKS

WARNING

Block the truck wheels before you cage the power spring, since caging the spring releases the parking brakes.

WARNING

The spring brake chamber contains a powerful spring. Do not remove the clamp rings or disassemble the chambers even with the compression spring caged. Refer to DS/GS Maintenance if internal service is required.



LEGEND:

1. PARK BRAKE CONTROL
2. MANUAL DRAIN VALVE
3. RELEASE NUT
4. AIR LINE (2)
5. FLAT WASHER (2)
6. LOCKWASHER (2)
7. NUT (2)
8. YOKE
9. SLACK ADJUSTER
10. COTTER KEY
11. PIN
12. AIR CHAMBER
13. RELEASE STUD
14. ACCESS HOLE
15. CAP
16. WASHER

TA216416

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. CAGING POWER SPRING.		
	CAUTION Do not use an impact wrench with a torque setting higher than 30 lb-ft (41 N·m) to cage power spring.	
1. Wheels	Block.	
2. CAB/Park brake control (1).	Push to release park brakes.	
3. Cap (15).	Pull out from access hole (14).	
4. Release nut (3) and washer (16).	Unscrew from release stud (13). Remove stud from its holder.	
5. Release stud (13).	a. Insert stud through access hole (14) and turn 1/4 turn to secure cross pin into pressure plate. b. Screw on nut (3) and washer (16). c. Turn release stud assembly with wrench until compression spring is fully caged.	
B. REMOVAL.		
6. Manual drain valves (2).	a. Turn to drain air pressure. Exhaust pressure from both service reservoirs on the M915, M916, and M918 and all three service reservoirs on the M917, M919 and M920. b. Close drain valves.	
7. Two air lines (4).	a. Use tape to mark air lines.	This will help you connect them properly during installation.
	b. Unscrew and remove	Replace if necessary.
	c. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	
8. Cotter key (10) and pin (11).	Remove.	
9. Yoke (8).	Disconnect from slack adjuster (9).	
10. Two nuts (7), lockwashers (6), and flat washers (5).	Unscrew and remove. Remove air chamber (12).	

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

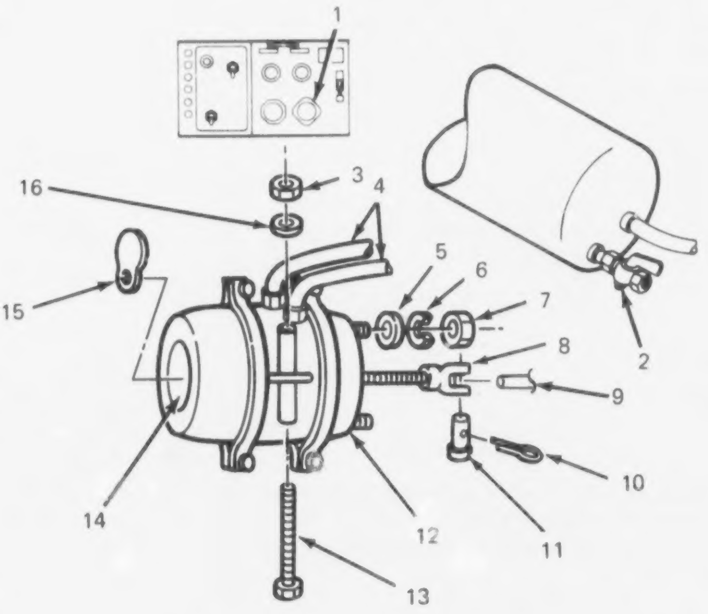
C. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
11. Air chamber (12).	Position on mounting bracket.	Exhaust check valve should point down.
12. Two nuts (7), lockwashers (6) and flat washers (5).	a. Screw on. b. Tighten nuts to 100 lb-ft (136 N·m) with torque wrench.	

NOTE

Upper nut on both chambers cannot be torqued unless a 15/16 crowfoot is used.

LOCATION/ITEM	ACTION	REMARKS
13. Yoke (8).	Attach to slack adjuster (9).	
14. Pin (11) and cotter key (10).	Install in yoke (8).	



LEGEND:

1. PARK BRAKE CONTROL
2. MANUAL DRAIN VALVE
3. RELEASE NUT
4. AIR LINE (2)
5. FLAT WASHER (2)
6. LOCKWASHER (2)
7. NUT (2)
8. YOKE
9. SLACK ADJUSTER
10. COTTER KEY
11. PIN
12. AIR CHAMBER
13. RELEASE STUD
14. ACCESS HOLE
15. CAP
16. WASHER

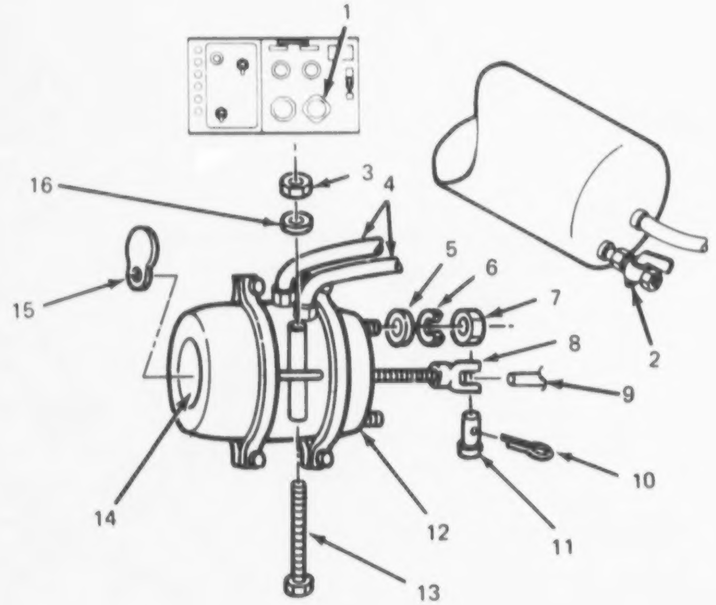
TA 074952

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
15. Two air lines (4).	a. Coat threads with liquid teflon. b. Screw in and tighten.	Be sure to connect each line to the correct port.
16. Manual drain valves (2).	Ensure they are closed.	
D. UNCAGING POWER SPRING.		
17 Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
18. CAB/Park brake control (1).	Push in.	
19. Release stud (13).	a. Turn nut (3) with washer (16) to release spring. b. Remove nut (3) and washer (16) from stud (13). c. Turn stud (13) 1/4 turn counterclockwise (left) and remove from access hole (14). d. Insert stud (13) into holder and secure with washer (16) and nut (3).	
20. Cap (15).	Press into access hole (14).	
E. OPERATIONAL CHECK.		
	NOTE Operational check requires system pressure of at least 100 psi (690 kPa). Run engine until this pressure is reached.	
21. Engine.	Shut down.	
22. CAB/Park brake control (1).	a. Push in. b. Pull out.	Second mechanic.
23. Air chamber (12).	a. Should actuate when valve is pulled out, and release when valve is pushed in.	First mechanic.

9-37. REAR BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. OPERATIONAL CHECK (Continued).		
	b. Use soap solution to check for leaks.	
24. CAB/Brake pedal.	a. Press down. b. Release.	Second mechanic.
25. Air chamber (12).	Should apply when pedal is pressed, and release when pedal is released.	



LEGEND:

1. PARK BRAKE CONTROL
2. MANUAL DRAIN VALVE
3. RELEASE NUT
4. AIR LINE (2)
5. FLAT WASHER (2)
6. LOCKWASHER (2)
7. NUT (2)
8. YOKE
9. SLACK ADJUSTER
10. COTTER KEY
11. PIN
12. AIR CHAMBER
13. RELEASE STUD
14. ACCESS HOLE
15. CAP
16. WASHER

TA 074953

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Disassembly.	(15)
c. Assembly .	(15)
d. Installation.	(10)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Tape.
Marking Pen.
Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

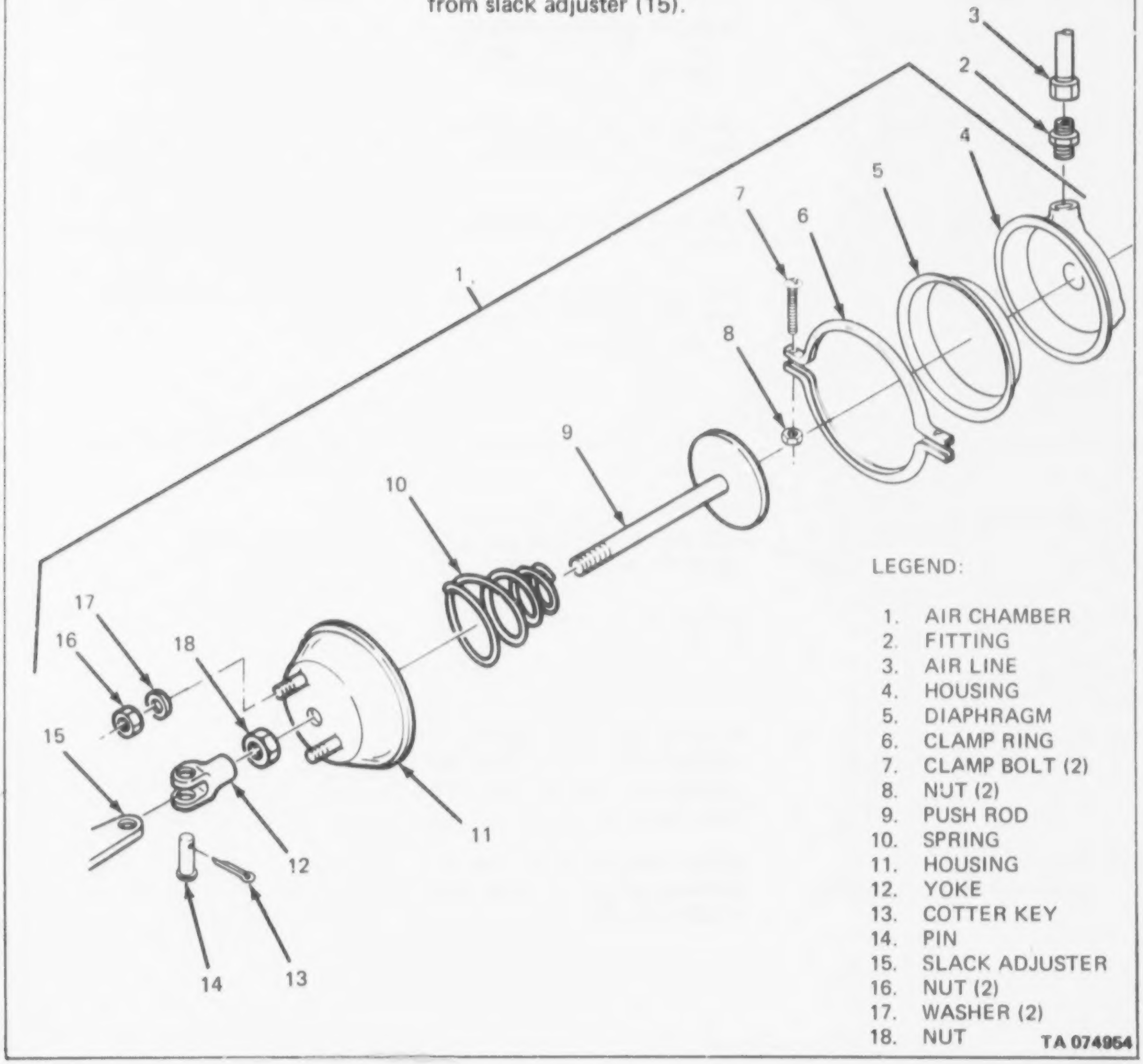
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Wheels Blocked.

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Air line (3).	Unscrew and remove from fitting (2).	
2. Fitting (2).	Remove from housing (4).	
3. Cotter key (13) and pin (14).	Remove and disassemble yoke (12) on push rod (9) from slack adjuster (15).	



LEGEND:

1. AIR CHAMBER
2. FITTING
3. AIR LINE
4. HOUSING
5. DIAPHRAGM
6. CLAMP RING
7. CLAMP BOLT (2)
8. NUT (2)
9. PUSH ROD
10. SPRING
11. HOUSING
12. YOKE
13. COTTER KEY
14. PIN
15. SLACK ADJUSTER
16. NUT (2)
17. WASHER (2)
18. NUT

TA 074954

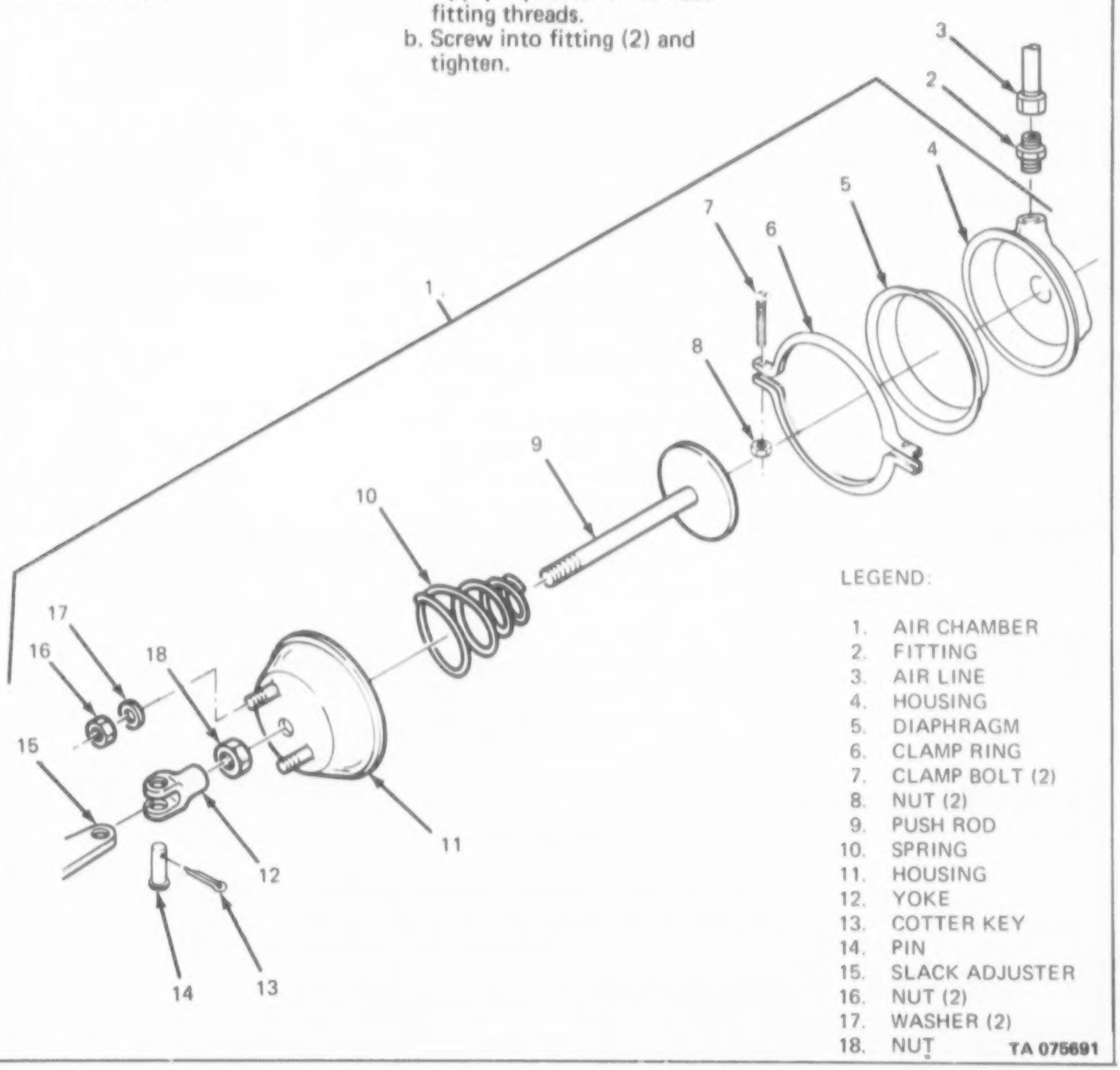
9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Two nuts (16) and washers (17).	Unscrew and remove housing (11) with assembled air chamber (1) from mounting bracket on vehicle.	
B. DISASSEMBLY.		
5. Push rod (9).	a. Wrap with tape. b. Apply suitable pressure with vice grips to retain spring (10) in position.	Clamp vise grips onto rod close to housing (11).
6. Assembled housings (4) and (11).	Using marker pencil, draw a line from one end to the other.	You will use this line to aline parts during reassembly.
7. Two nuts (8).	Unscrew and remove clamp bolts (7).	
8. Clamp ring (6).	Pull apart and separate housings (4) and (11) for access to diaphragm (5).	Replace diaphragm if necessary.
C. ASSEMBLY.		
9. Diaphragm (5).	Position between housings (4) and (11).	Use the line you drew in step 6 to aline housings.
10. Clamp ring (6).	Position over housings joint and secure with two clamp bolts (7), and nuts (8).	
11. Push rod (9).	a. Remove vise grips. b. Remove tape.	
D. INSTALLATION.		
12. Housing (11) with assembled air chamber.	Position housing studs thru vehicle mounting bracket and secure with two washers (17) and nuts (16).	
13. Slack adjuster (15) and yoke (12) on push rod (9).	Aline holes, slide pin (14) in position and secure with new cotter key (13).	

BRAKE SYSTEM.

9-38. PUSHER AXLE BRAKE AIR CHAMBER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION (Continued).		
14. Fitting (2).	a. Apply liquid teflon to threads. b. Screw into housing (4) and tighten.	
15. Air line (3).	a. Apply liquid teflon to hose fitting threads. b. Screw into fitting (2) and tighten.	



LEGEND:

1.	AIR CHAMBER
2.	FITTING
3.	AIR LINE
4.	HOUSING
5.	DIAPHRAGM
6.	CLAMP RING
7.	CLAMP BOLT (2)
8.	NUT (2)
9.	PUSH ROD
10.	SPRING
11.	HOUSING
12.	YOKE
13.	COTTER KEY
14.	PIN
15.	SLACK ADJUSTER
16.	NUT (2)
17.	WASHER (2)
18.	NUT

BRAKE SYSTEM.

9-39. SLACK ADJUSTERS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Adjustment – Slack Adjuster (Forward Rear Tandem). (15)
b. Adjustment – Push Rod (Rear Rear Tandem). (30)

45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

Two (MOS63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10).	Wheel Raised OFF Ground; Park Brake Should Be Released And Wheels Blocked.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission In Neutral.

9-39. SLACK ADJUSTERS MAINTENANCE (Continued).

A. ADJUSTMENT – SLACK ADJUSTER.

NOTE

The procedure in this paragraph is limited to adjustment; it should be performed with wheel off of ground and parking brake released.

LOCATION/ITEM	ACTION	REMARKS
1. Adjusting screw (2).	a. While turning wheel rotate adjusting screw (2) until brakeshoes are tight against brakedrum. b. Back off adjusting screw (2) approximately one turn or until wheel does not drag.	
2. CAB/Brake pedal.	Push completely down.	Second mechanic.
3. Slack adjuster (3) and push rod (6).	a. If brake chamber push rod (6) travel is less than 3/4 inch (1.9 cm) or more than 1 inch (2.54 cm) go to part B. b. If brake chamber push rod (6) travel is 3/4 to 1 inch (1.9 cm to 2.54 cm), adjustment is satisfactory. c. If angle between slack adjuster (3) and push rod (6) is less than 90°, go to part B. d. If angle between slack adjuster (3) and push rod (6) is more than 90°, adjustment is satisfactory.	

B. ADJUSTMENT – PUSH ROD.

WARNING

Do this procedure carefully. The slack adjuster may be turned toward the brake chamber and might snap back.

best copy available

BRAKE SYSTEM.

9-39. SLACK ADJUSTERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. ADJUSTMENT – PUSH ROD (Continued).		
4. Slack adjuster (3).	If push rod travel does not fall between 3/4 to 1 inch (1.9 cm to 2.54 cm), tighten adjusting screw to decrease travel or loosen to increase travel.	
5. Cotter key (4) and clevis pin (5).	a. Remove. b. Disconnect slack adjuster (3) from push rod (6).	
6. Push rod locknut (7).	a. Loosen. b. Turn push rod (7) to shorten.	
7. Clevis pin (5).	Insert into slack adjuster (3).	
8. CAB/Brake pedal.	Push completely down.	Second mechanic.
9. Slack adjuster (3) and push rod (6).	If angle between slack adjuster (3) and push rod (6) is at least 90°, go to step 10.	First mechanic.
10. Locknut (7).	Tighten.	
11. Cotter key (4)	Push into clevis pin (5).	

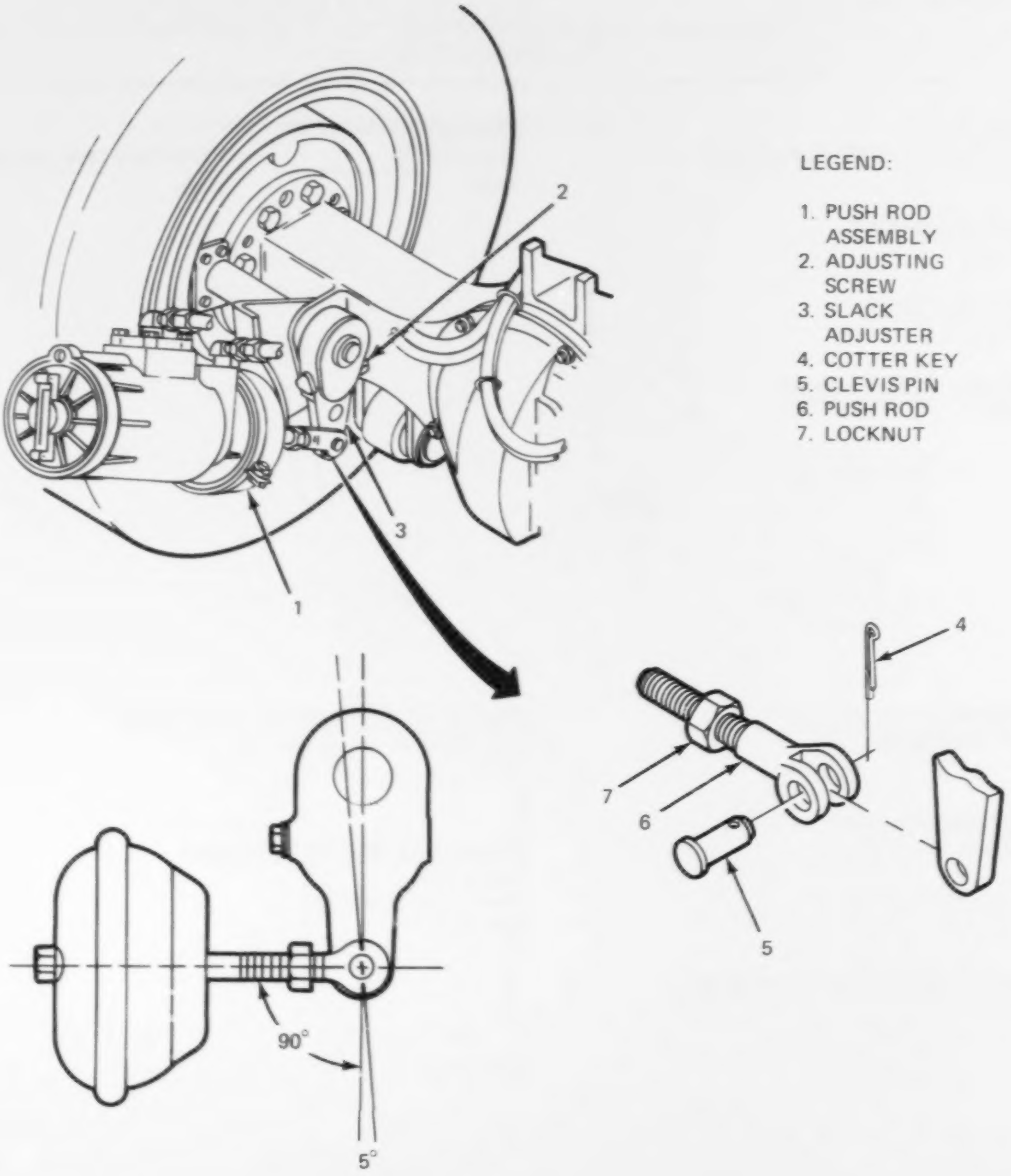
NOTE

If adjustment to the push rod/slack adjuster angle is necessary, the push rod travel must be rechecked.

BRAKE SYSTEM.

9-39. SLACK ADJUSTERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. PUSH ROD ASSEMBLY
2. ADJUSTING SCREW
3. SLACK ADJUSTER
4. COTTER KEY
5. CLEVIS PIN
6. PUSH ROD
7. LOCKNUT

TA 237234

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Operational Check.	(2)
	12 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehcile Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

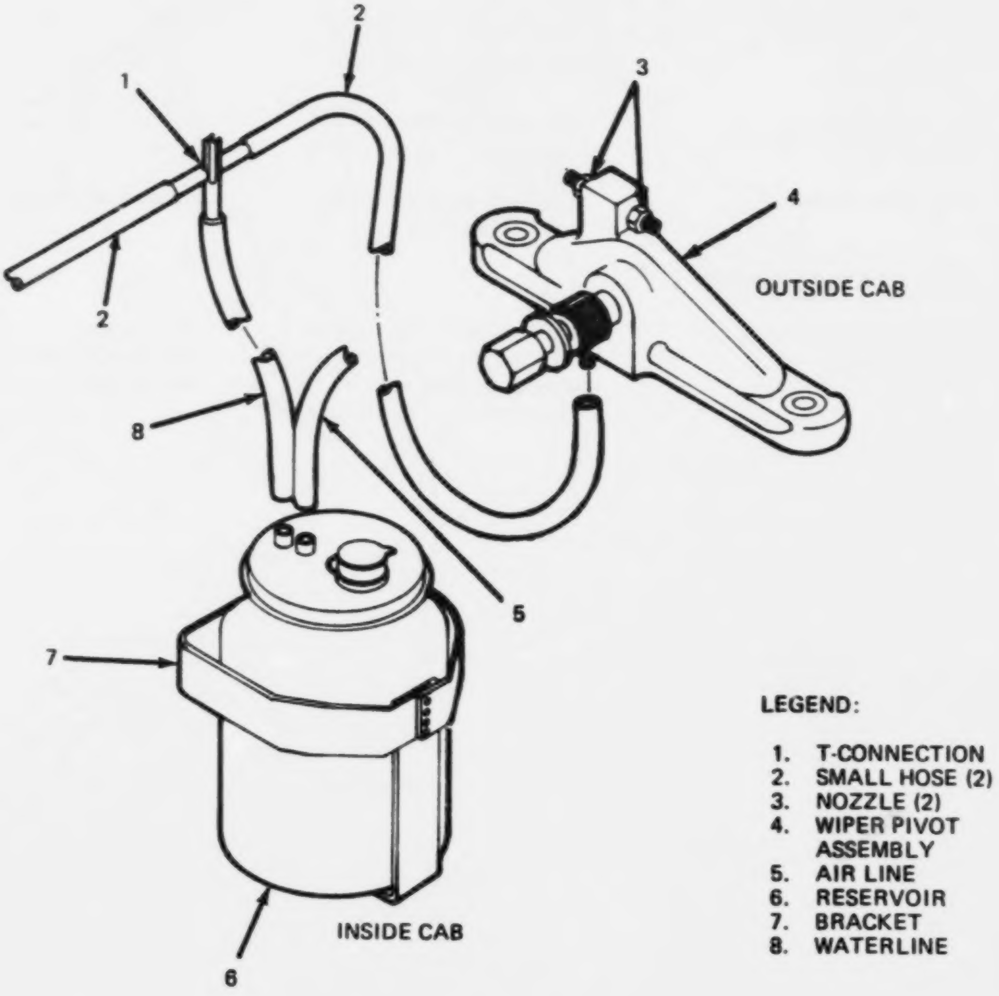
TROUBLESHOOTING REFERENCES

Table 9-1.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two small hoses (2).	Disconnect from wiper pivot assemblies (4).	Remove heater duct to gain access to hose (2) on right side.
2. Air line (5) and waterline (8).	Disconnect from reservoir (6).	



LEGEND:

1. T-CONNECTION
2. SMALL HOSE (2)
3. NOZZLE (2)
4. WIPER PIVOT ASSEMBLY
5. AIR LINE
6. RESERVOIR
7. BRACKET
8. WATERLINE

TA 074956

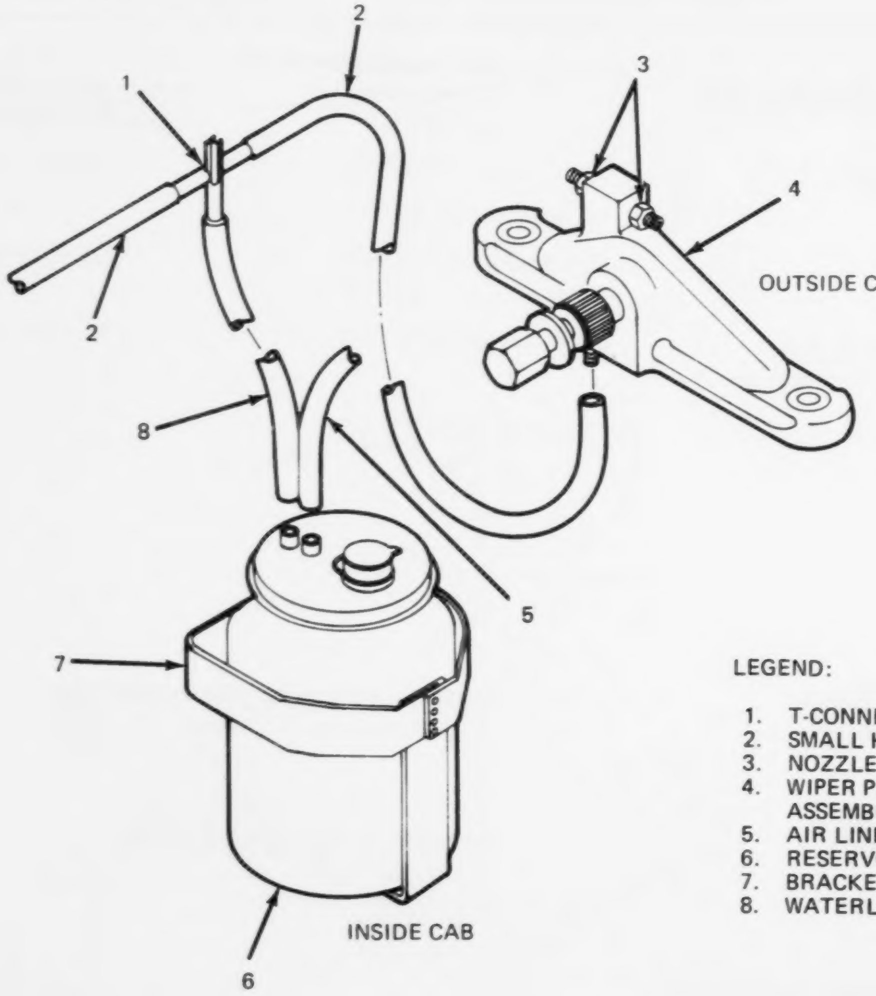
AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-40. WINDSHIELD WASHER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Reservoir (6).	Lift out of bracket (7).	
4. Two small hoses (2), T-connection (1), and water line (8).	Inspect for: a. Leaks. b. Cracks.	Replace if necessary.
B. INSTALLATION.		
5. Reservoir (6).	Set into bracket (7).	
6. Air line (5) and waterline (8).	Connect to reservoir (6).	
7. Two small hoses (2).	Connect to wiper pivot assemblies (4).	Reconnect heater duct.
C. OPERATIONAL CHECK.		
8. INSTRUMENT PANEL/ Washer button.	Push. Check that washer fluid is squirted onto windshield. Adjust nozzles (3) if necessary. Check for leaks.	If air pressure is low, you may need to start engine before washers will work.

9-40. WINDSHIELD WASHERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
2
3
4
OUTSIDE CAB
8
5
7
6
INSIDE CAB

LEGEND:

1. T-CONNECTION
2. SMALL HOSE (2)
3. NOZZLE (2)
4. WIPER PIVOT ASSEMBLY
5. AIR LINE
6. RESERVOIR
7. BRACKET
8. WATERLINE

TA 074957

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(7)
b. Inspection of Air Lines.	(7)
c. Installation.	(1)
d. Operational Check.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

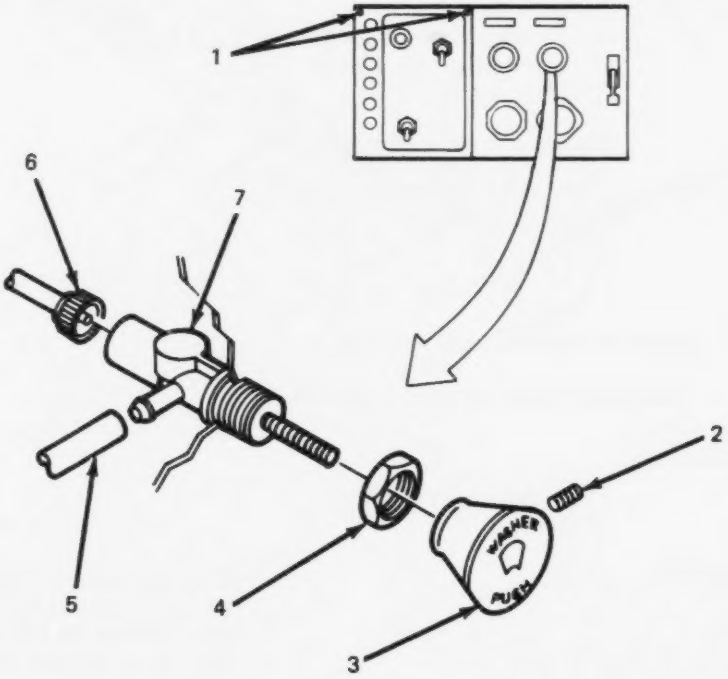
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two quarter-turn screws (1).	Loosen so that instrument panel can be lowered.	
2. Supply line fitting (6).	Unscrew from valve body (7).	
3. Allen screw (2).	Remove.	
4. Control knob (3).	Remove.	
5. Nut (4).	Loosen and remove.	
6. Valve body (7).	Remove from back side of panel.	
7. Outlet hose (5).	Pull off of valve body (7).	



LEGEND:

1. QUARTER-TURN SCREW (2)
2. ALLEN SCREW
3. CONTROL KNOB
4. NUT
5. OUTLET HOSE
6. SUPPLY LINE FITTING
7. VALVE BODY

TA 074958

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).

B. INSPECTION OF AIR LINES AND FITTINGS.

LOCATION/ITEM	ACTION	REMARKS
8. Air supply line, and fitting (6), air outlet hose (5).	Inspect for: a. Cracks. b. Leaks. c. Brittleness. d. Damaged fittings.	Replace if necessary.

C. INSTALLATION .

LOCATION/ITEM	ACTION	REMARKS
9. Outlet hose (5).	Push onto arm of valve body (7).	
10. Valve body (7).	a. Put through hole in instrument panel. b. Screw on and tighten nut (4). c. Install control knob (3) and tighten Allen screw (2).	
11. Supply line fitting (6).	Screw into valve body (7).	
12. Two quarter-turn screws (1).	Tighten to fasten instrument panel in position.	

NOTE

Follow-on maintenance required:

Reconnect batteries per para 5-37B.

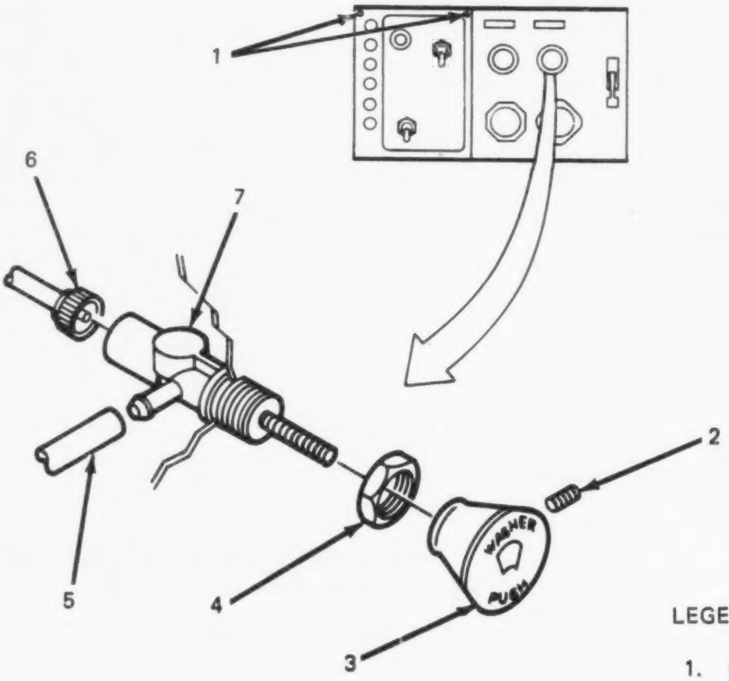
D. OPERATIONAL CHECK.

LOCATION/ITEM	ACTION	REMARKS
13. Engine RUN switch.	Turn ON (see TM 9-2320-273-10).	
14. Washer control knob (3).	Push.	If washer does not work, lower dash panel and check for leakage at air line connections. If there is no leakage, troubleshoot the rest of the washer system (para 9-5).
15. Engine RUN switch.	Turn OFF (see TM 9-2320-273-10).	

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-41. WINDSHIELD WASHER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (2)
2. ALLEN SCREW
3. CONTROL KNOB
4. NUT
5. OUTLET HOSE
6. SUPPLY LINE FITTING
7. VALVE BODY

TA 074959

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Installation.	(30)
c. Operational Check.	(11)
	71 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Masking Tape.
Marking Pen.
Gasket (4730-01-055-4013).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

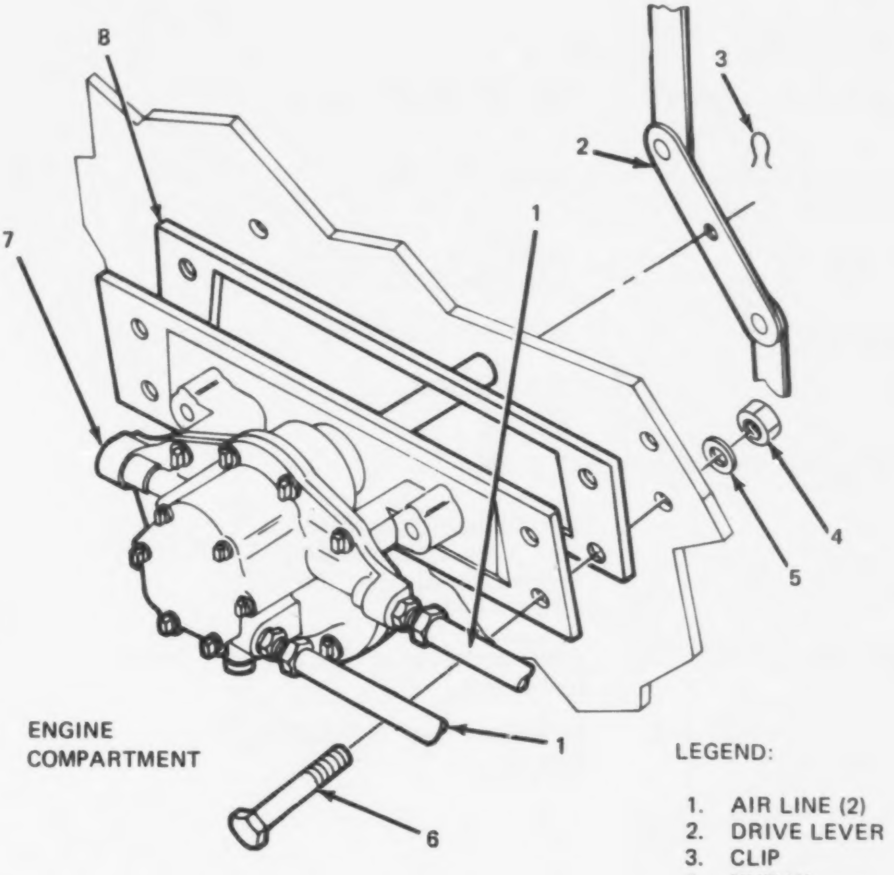
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

AUXILIARY AIR-POWERED COMPONENT SYSTEM.

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Clip (3).	Remove.	
2. Drive lever (2).	Remove from motor shaft.	



LEGEND:

1. AIR LINE (2)
2. DRIVE LEVER
3. CLIP
4. NUT (4)
5. WASHER (4)
6. CAPSCREW (4)
7. MOTOR
8. GASKET

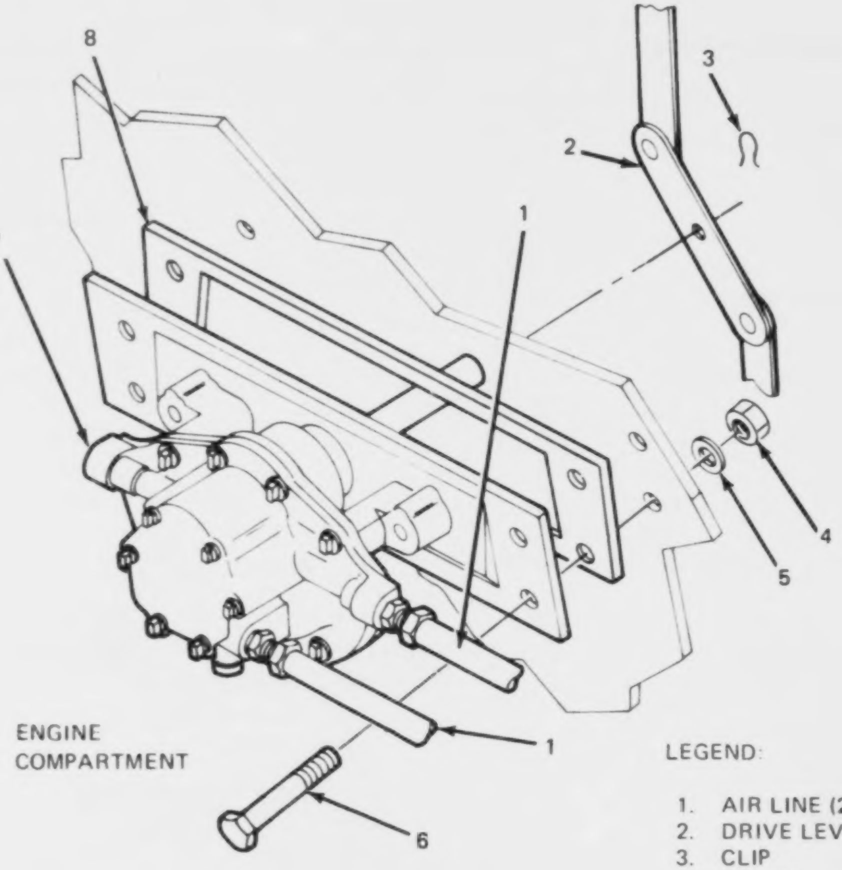
TA 074960

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two air lines (1).	a. Use masking tape to mark PARK and RUN air lines. b. Unscrew and remove.	
4. Four capscrews (6), washers (5) and nuts (4).	Unscrew and remove motor (7) and gasket (8).	Discard gasket.
B. INSTALLATION.		
5. New gasket (8) and motor (7).	Position against firewall.	
6. Four capscrews (6), washers (5) and nuts (4).	Screw in and tighten.	
7. Two air lines (1).	Screw into ports marked PARK and RUN. Tighten.	
8. Drive lever (2).	Slide onto motor shaft.	
9. Clip (3).	Clip onto shaft.	
C. OPERATIONAL CHECK.		
10. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
11. Windshield wipers.	Check operation at high and low speeds.	
12. Engine.	Shut down (see TM 9-2320-273-10).	

9-42. WINDSHIELD WIPER MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


8
3
2
1
7
4
5
ENGINE
COMPARTMENT
1
6

LEGEND:

1. AIR LINE (2)
2. DRIVE LEVER
3. CLIP
4. NUT (4)
5. WASHER (4)
6. CAPSCREW (4)
7. MOTOR
8. GASKET

TA 074961

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(7)
b. Inspection of Air Lines.	(2)
c. Installation.	(11)
d. Operational Check.	(1)
	21 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Masking Tape.
Marking Pen.
Liquid Teflon (refer to appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-37A.	Batteries Disconnected.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

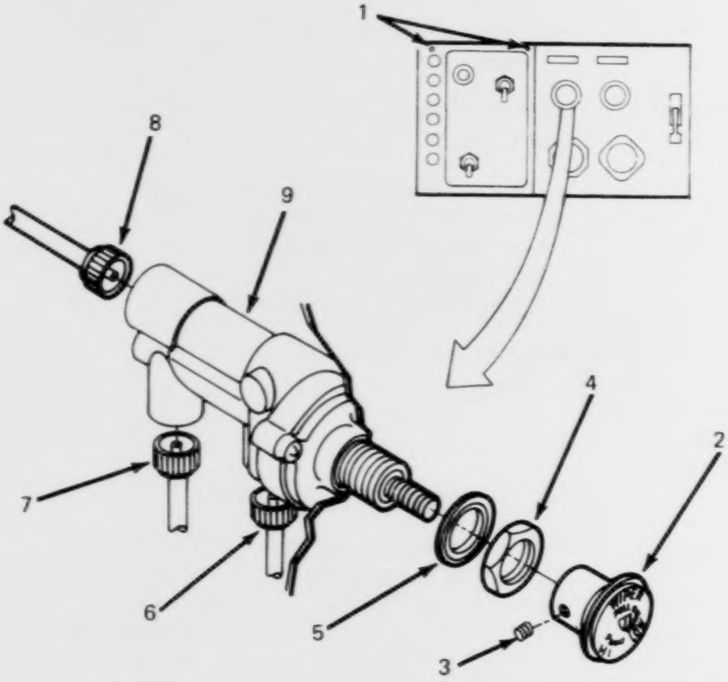
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Allen screw (3).	a. Loosen with Allen wrench. b. Remove knob (2).	
2. Two quarter-turn screws (1).	Loosen so that instrument panel can be lowered.	
3. Supply line (8), wiper park line (7), and wiper run line (6).	a. Use tape and marker pen to identify each line. b. Unscrew fittings from valve body (9).	
4. Nut (4) and washer (5).	a. Unscrew and remove. b. Remove valve body (9) from back side of panel.	



LEGEND:

1. QUARTER-TURN SCREW (2)
2. KNOB
3. ALLEN SCREW
4. NUT
5. WASHER
6. RUN LINE
7. PARK LINE
8. SUPPLY LINE
9. VALVE BODY

TA 074962

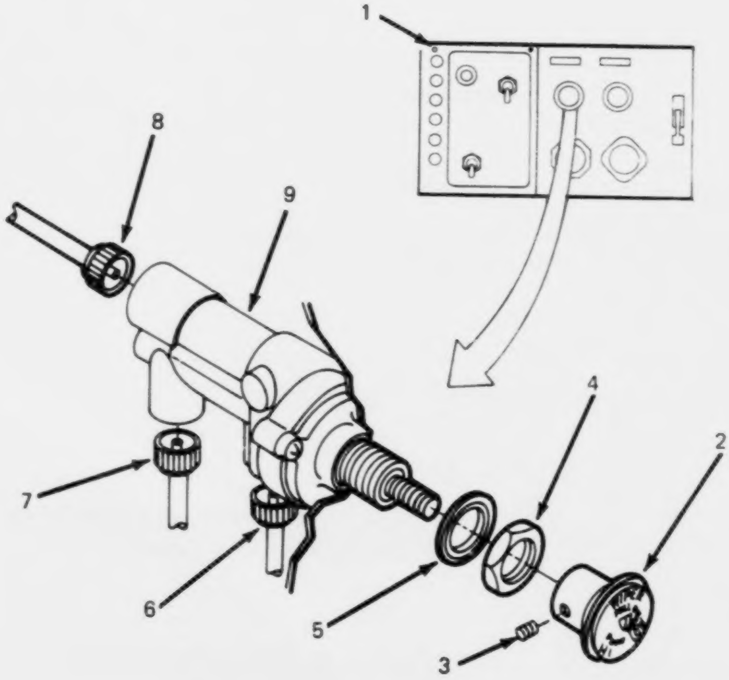
9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF LINES AND FITTINGS.		
5. Supply line (8), wiper park line (7), and wiper run line (6).	Inspect for: a. Cracks. b. Leaks. c. Damaged fittings.	Replace if necessary.
C. INSTALLATION.		
6. Supply line (8), wiper park line (7), and wiper run line (6).	Screw into valve body (9). Be sure that each line is screwed into the proper opening.	
7. Valve body (9).	a. Push forward through hole in rear of instrument panel. b. Screw on and tighten washer (5) and nut (4).	
8. Two quarter-turn screws (1).	Tighten to fasten instrument panel cover.	
9. Knob (2).	a. Push onto valve body and twist until Allen setscrew (3) is seated properly on stem of valve body. b. Tighten with Allen wrench.	
10. Batteries.	Connect (see para 5-37B).	
D. OPERATIONAL CHECK.		
10. Engine RUN switch.	Turn ON (see TM 9-2320-273-10).	
11. Wiper knob.	Pull out. Check to see that wipers operate properly on HI, LOW, and PARK.	If wipers do not work, open panel and check for air leaks at fittings. If no leaks are present troubleshoot the rest of the wiper system (see para 9-5).
12. Engine RUN switch.	Turn OFF (see TM 9-2320-273-10).	

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-43. WINDSHIELD WIPER CONTROL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. QUARTER-TURN SCREW (2)
2. KNOB
3. ALLEN SCREW
4. NUT
5. WASHER
6. RUN LINE
7. PARK LINE
8. SUPPLY LINE
9. VALVE BODY

TA 074963

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(6)
c. Checking for Leaks.	(2)
	13 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Soap and Water Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 9-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.
5-83A.	Differential Lockup Switch Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Differential Lockup Engaged.
Engine OFF.
Transmission in Neutral.
Park Brake Set.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

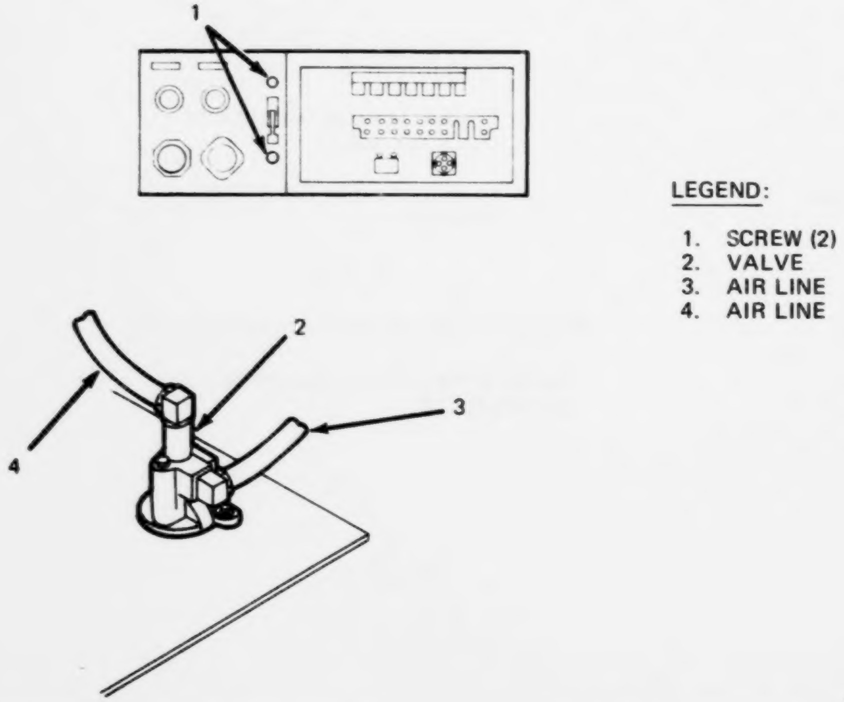
Do not remove differential lockup control valve until pressure is completely exhausted from all reservoirs.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two screws (1).	Loosen and remove valve (2).	

NOTE

The figure below shows M915 valve. M916 through M920 valves have three air line connections.



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AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Air lines (3) and (4).	a. Unscrew and remove. b. Inspect for: 1. Cracks. 2. Leaks. 3. Damaged fittings.	Replace if necessary.
B. INSTALLATION.		
3. Air lines (3) and (4).	Screw into valve (2) and tighten.	
4. Valve (2).	Remount in instrument panel and install two screws (1).	
C. CHECKING FOR LEAKS.		
5. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
6. Valve (2).	Engage, use soap solution to check for leaks.	
7. Engine.	Shut down (see TM 9-2320-273-10).	

NOTE

Follow-on maintenance action required:

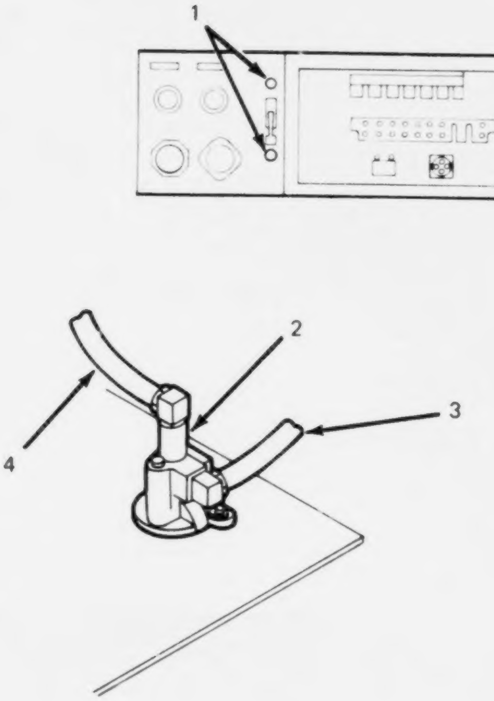
Install differential lockup switch; refer to para 5-83B.

9-44. DIFFERENTIAL LOCKUP CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

The figure below shows M915 valve, M916 through M920 valves have three air line connections.



LEGEND:

1. SCREW (2)
2. VALVE
3. AIR LINE
4. AIR LINE

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AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(18)
b. Installation.	(22)
c. Operational Check.	(5)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (Refer to Appendix C).
Soap and Water Solution.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
9-13A.	Air Reservoirs Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

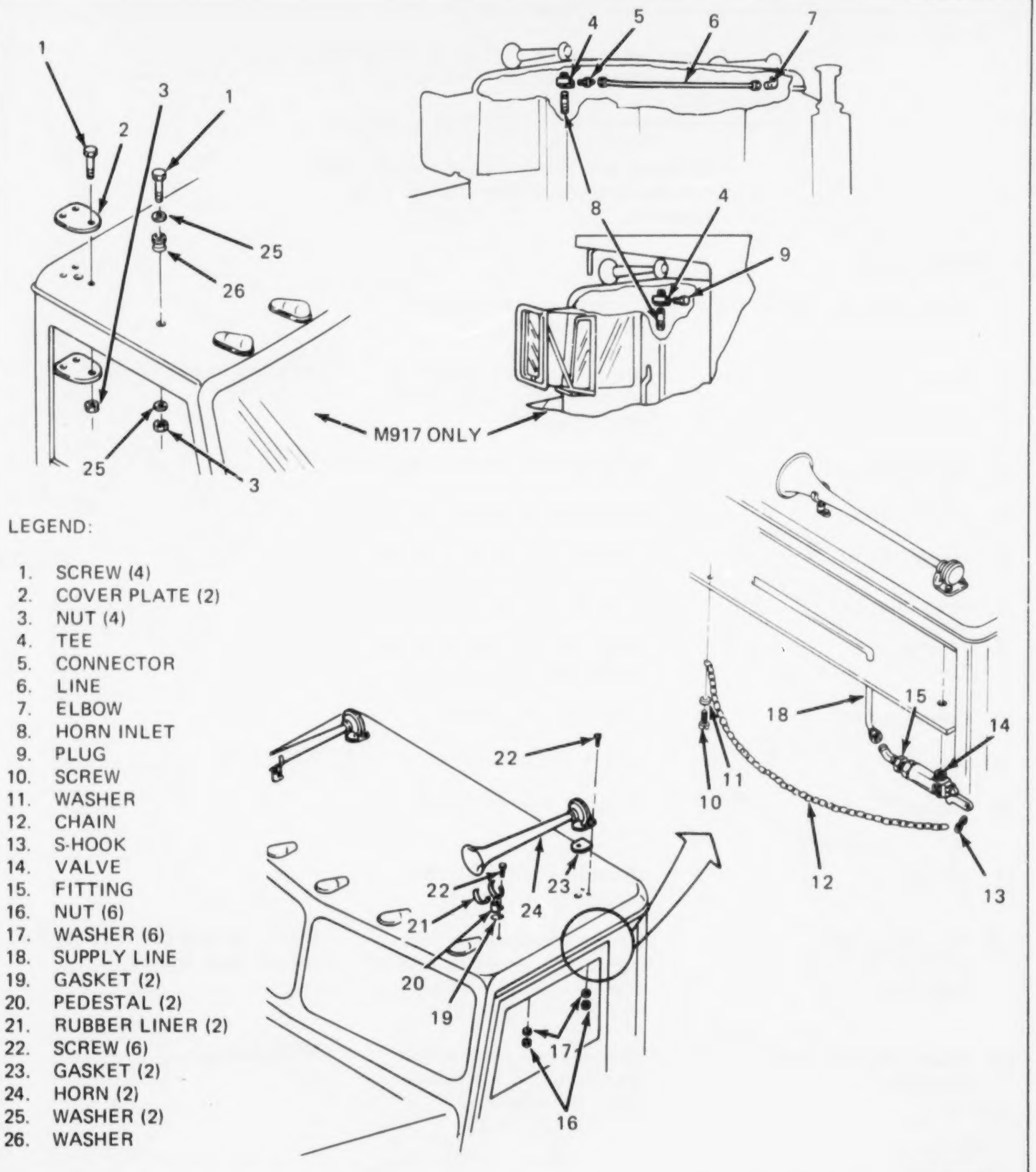
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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M917 ONLY
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LEGEND:

1. SCREW (4)
2. COVER PLATE (2)
3. NUT (4)
4. TEE
5. CONNECTOR
6. LINE
7. ELBOW
8. HORN INLET
9. PLUG
10. SCREW
11. WASHER
12. CHAIN
13. S-HOOK
14. VALVE
15. FITTING
16. NUT (6)
17. WASHER (6)
18. SUPPLY LINE
19. GASKET (2)
20. PEDESTAL (2)
21. RUBBER LINER (2)
22. SCREW (6)
23. GASKET (2)
24. HORN (2)
25. WASHER (2)
26. WASHER

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

WARNING

Do not remove valve (14) until pressure is fully exhausted from all reservoirs.

NOTE

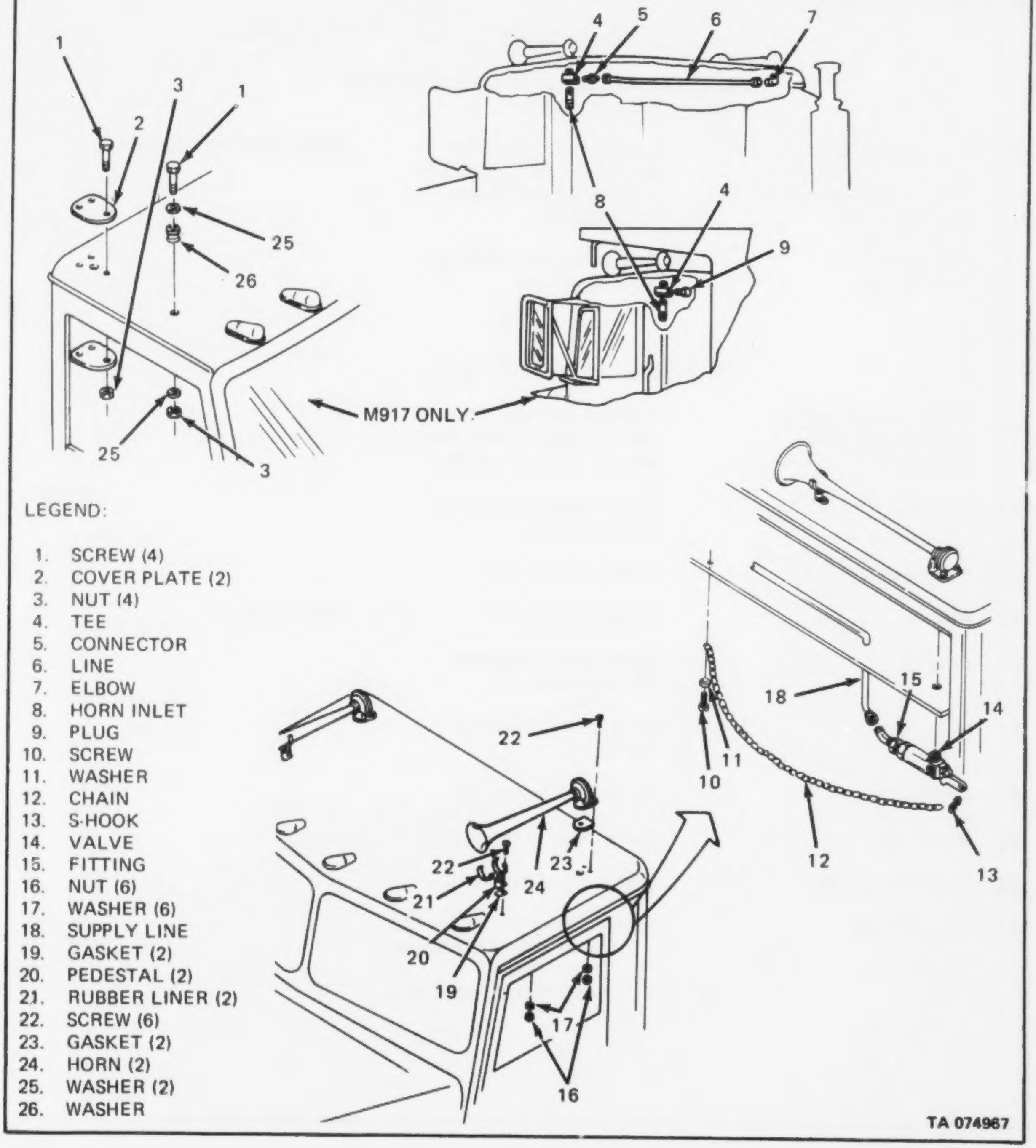
For access to horns and valve remove headliner screws and pull down headliner as necessary.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Screw (10) and washer (11).	Unscrew and remove one end of chain (12).	
2. Chain (12).	Disconnect from handle on valve (14) by slightly opening S-hook (13).	Use pliers to open S-hook.
3. Supply line (18).	Unscrew from fitting (15).	
4. Fitting (15).	Unscrew from valve (14).	
5. Valve (14).	Unscrew from horn inlet (8).	
6. Horn inlet (8).	Unscrew from tee (4).	
7. Line (6).	Unscrew from connector (5) and elbow (7).	
8. Connector (5).	Unscrew from tee (4).	
9. Plug (9).	Unscrew from tee (4).	M917 only.
10. Tee (4).	Unscrew from left hand horn (24).	
11. Elbow (7).	Unscrew from right hand horn (24).	
12. Six screws (22), washers (17), and nuts (16).	Unscrew and remove two horns (24), pedestals (20), gaskets (23), gaskets (19), and rubber liners (21).	M917 has only one horn located on left hand side.
13. Four screws (1) and nuts (3).	Unscrew and remove two plate covers (2), washers (25), and washer (26).	M917 only.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. SCREW (4)
2. COVER PLATE (2)
3. NUT (4)
4. TEE
5. CONNECTOR
6. LINE
7. ELBOW
8. HORN INLET
9. PLUG
10. SCREW
11. WASHER
12. CHAIN
13. S-HOOK
14. VALVE
15. FITTING
16. NUT (6)
17. WASHER (6)
18. SUPPLY LINE
19. GASKET (2)
20. PEDESTAL (2)
21. RUBBER LINER (2)
22. SCREW (6)
23. GASKET (2)
24. HORN (2)
25. WASHER (2)
26. WASHER

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

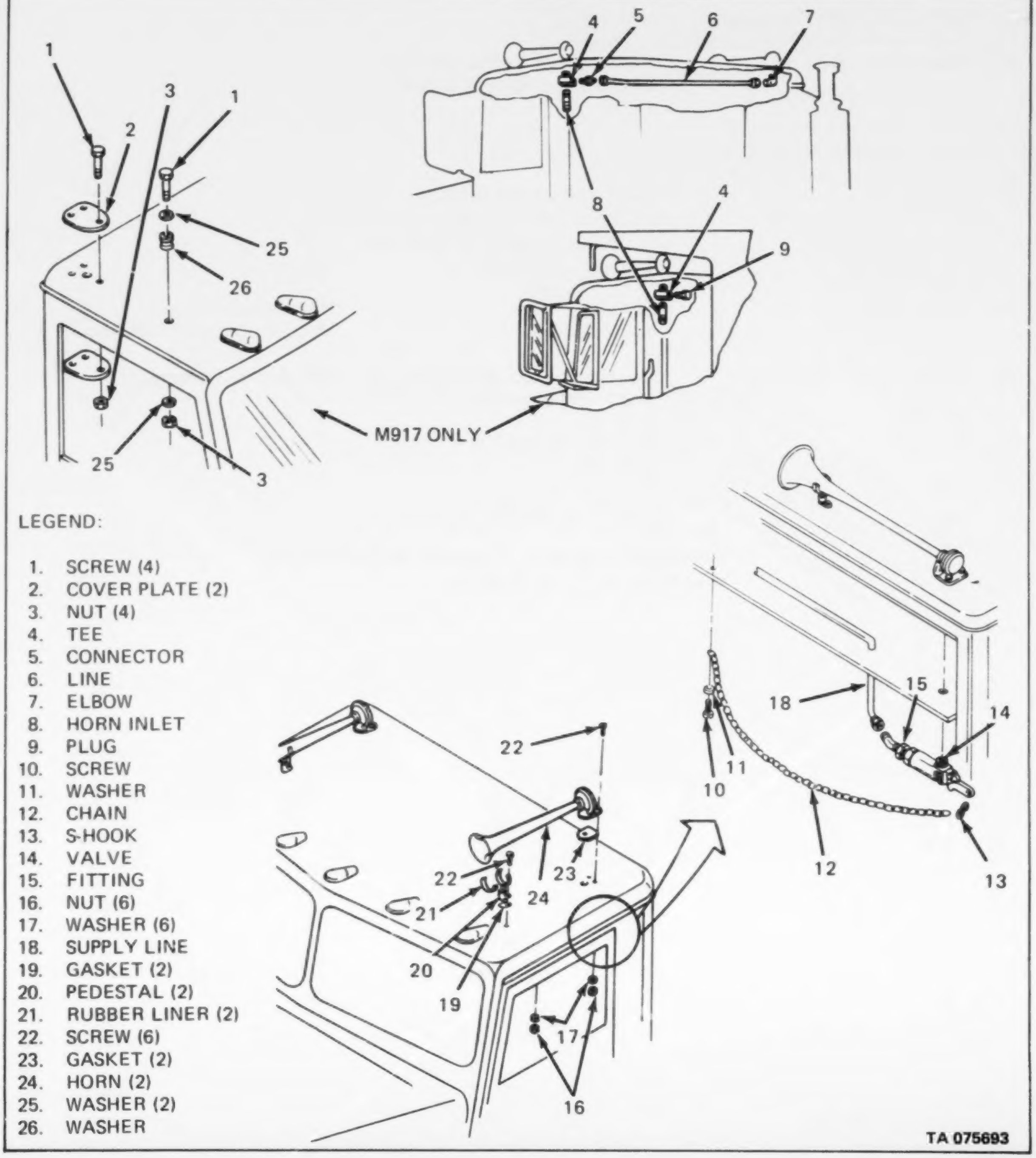
B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
	NOTE Coat all threaded connections with liquid teflon as you assemble.	
14. Two gaskets (19), gaskets (23), pedestals (20), rubber liners (21), and horns (24).	Position on cab roof and install with six screws (22), washers (17), and and nuts (16).	M917 has only one horn.
15. Elbow (7).	Screw into horn (24) on right hand side.	
	NOTE Follow step 16. For M917 only.	
16. Two cover plates (2), washers (25), and washers (26).	Position on right hand cab roof and install with four screws (1) and nuts (3).	
17. Tee (4).	Screw into horn (24) on left hand side.	
18. Connector (5).	Screw into tee (4).	
19. Plug (9).	Screw into tee (4).	M917 only.
20. Line (6).	Screw onto connector (5) and elbow (7).	
21. Horn inlet (8).	Screw into bottom of tee (4).	
22. Fitting (15).	Screw into valve (14).	
23. Valve (14).	Screw onto horn inlet (8).	
24. Supply line (18).	Screw onto fitting (15).	
25. S-hook (13).	a. Hook thru hole in handle of valve (14) and one end of chain (12). b. Clamp S-hook closed with pliers.	

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. SCREW (4)
2. COVER PLATE (2)
3. NUT (4)
4. TEE
5. CONNECTOR
6. LINE
7. ELBOW
8. HORN INLET
9. PLUG
10. SCREW
11. WASHER
12. CHAIN
13. S-HOOK
14. VALVE
15. FITTING
16. NUT (6)
17. WASHER (6)
18. SUPPLY LINE
19. GASKET (2)
20. PEDESTAL (2)
21. RUBBER LINER (2)
22. SCREW (6)
23. GASKET (2)
24. HORN (2)
25. WASHER (2)
26. WASHER

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
26. Chain (12).	Secure other end to cab roof with screw (10) and washer (11).	
C. OPERATIONAL CHECK.		
27. Engine.	Start up (see TM 9-2320-273-10). Allow system to reach operating pressure of 105-120 psi (724-827 kPa).	
28. Chain (12).	a. Pull. b. Release.	Horn should blow. Horn should stop blowing.
29. Valve (14).	Check for leaks with soap and water solution.	Retighten as necessary.
30. Engine.	Shut down (see TM 9-2320-273-10).	

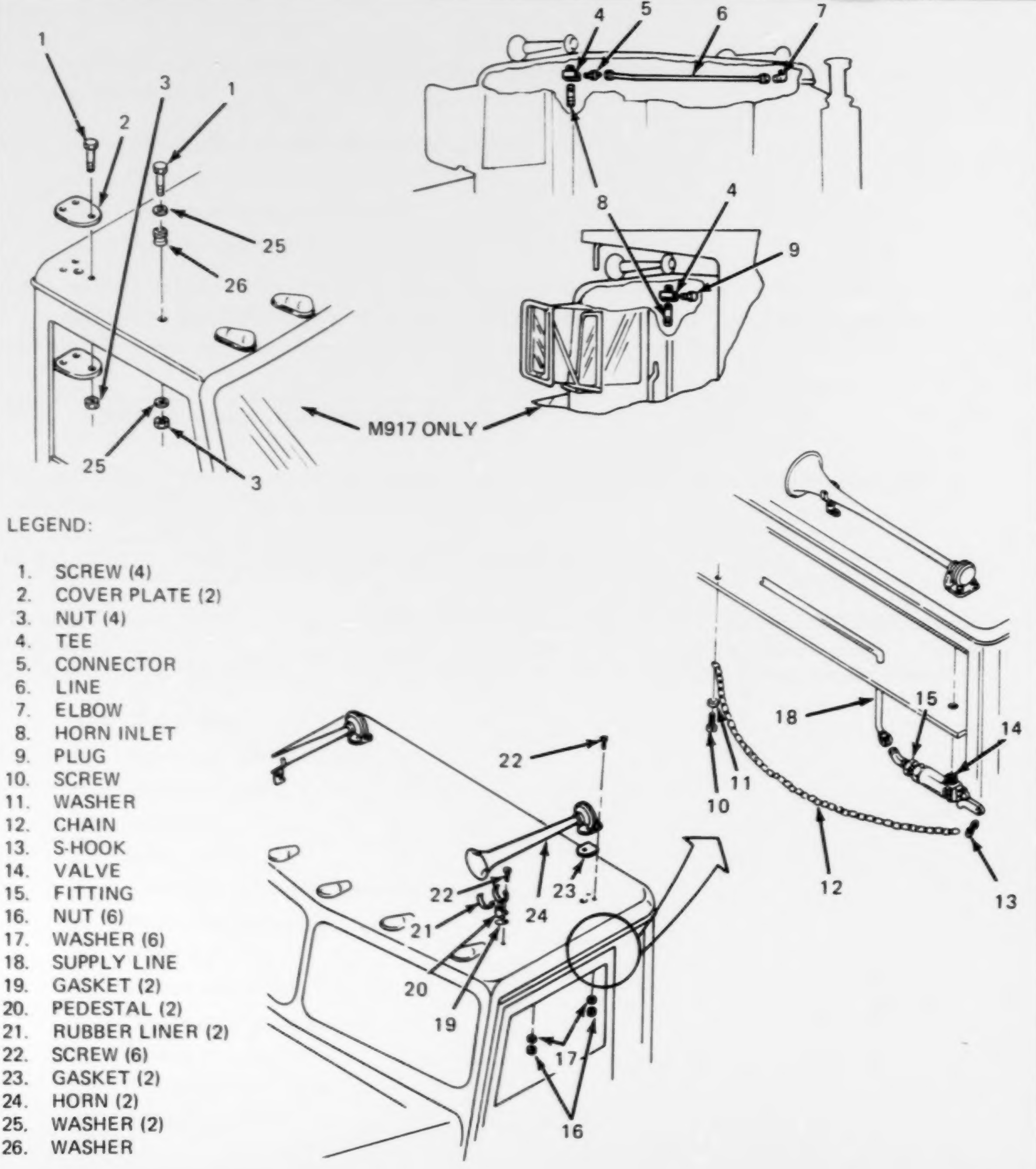
NOTE

Reposition headliner, if lowered, and secure with screws and trim washers.

AUXILIARY AIR-POWERED COMPONENT SYSTEMS.

9-45. AIR HORN AND CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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M917 ONLY
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LEGEND:

1. SCREW (4)
2. COVER PLATE (2)
3. NUT (4)
4. TEE
5. CONNECTOR
6. LINE
7. ELBOW
8. HORN INLET
9. PLUG
10. SCREW
11. WASHER
12. CHAIN
13. S-HOOK
14. VALVE
15. FITTING
16. NUT (6)
17. WASHER (6)
18. SUPPLY LINE
19. GASKET (2)
20. PEDESTAL (2)
21. RUBBER LINER (2)
22. SCREW (6)
23. GASKET (2)
24. HORN (2)
25. WASHER (2)
26. WASHER

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CHAPTER 10

WHEELS, STEERING, AND SUSPENSION SYSTEMS MAINTENANCE

10-1. OVERVIEW.

This chapter provides you with the following information related to wheels, steering, and suspension systems maintenance.

a. All required special tools and equipment.
b. Other technical manuals.
c. Troubleshooting procedures.
d. Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

10-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

10-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the wheels, steering, and suspension systems maintenance procedures described in this chapter are limited to the following items: (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

a. Toe-in gage.
b. Valve core removing tool.
c. Gooseneck tool.
d. Rim tool.
e. Safety cage.
f. 4-inch, 6-point wheel bearing nut wrench.
g. Wheel bearing packing tool.
h. Wheel dolly.
i. Tie rod end puller.
j. Pitman arm removing tool.
k. Pitman arm spacer.
l. Spacer removing tool.
m. Ball joint puller.

10-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering organizational maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

10-5. INTRODUCTION.

Tables 10-1 thru 10-3 contain instructions for troubleshooting the wheels, steering, and vehicle suspension. The correction actions describe how to fix the problem or refer to a procedure for fixing the problem. The troubleshooting tables are arranged by malfunctions in the following order.

WHEELS AND TIRES (table 10-1):

a. Tires wearing unevenly.
b. Noisy or bumpy sound while traveling down the road.

STEERING (table 10-2):

a. Front tires wearing unevenly.
b. Hard steering.
c. Vehicle wanders or pulls to one side.
d. Lost motion or excessive play in steering wheel.
e. Temporary increase in effort when turning steering wheel.
f. Vehicle does not fully steer from stop to stop.

SUSPENSION (table 10-3):

a. Vehicle wanders or shimmies.
b. Pusher axle will not raise or lower.
c. Rear axle assembly not tracking properly.

Table 10-1. Wheel and Tire Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. TIRES WEARING UNEVENLY:

Step 1. Check wheel alinement if problem is on front wheels.

Aline front wheels (para 10-10).

Step. 2. Check rear brakes for proper adjustment. (Front brakes are self-adjusting.)

Adjust brakes (para 9-33, 9-34, 9-39).

Step 3. Check wheel bearing for adjustment, lubrication, and damage.

Adjust, lubricate, or replace (para 10-13, 10-14, 10-15 or 10-16, as applicable).

2. NOISY OR BUMPING SOUND WHILE TRAVELING ON THE ROAD:

Step 1. Check lug wheel stud cap nuts for proper torque.

Tighten lug nuts to 450 lb-ft (610 N·m).

Step 2. Inspect U-bolts for tightness.

Tighten U-bolts (125-165 lb-ft (170-224 N·m) for M915, 200-270 lb-ft (271-366 N·m) for M916 thru M920).

Step 3. Inspect spring shackle pins for looseness using a pry bar. No noticeable movement is allowable.

Refer to Direct Support Maintenance.

Step 4. Check wheel bearings for vertical looseness using a prying bar beneath the tire. Check for proper lubrication and damage.

Adjust, lubricate, or replace bearing (para 10-13, 10-14, 10-15 or 10-16, as applicable).

Step 5. Inspect rear axle shaft for damage by jacking up both wheels. Turn wheels to one extreme and rotate one wheel by hand while listening for a rumbling or grinding sound within the axle. Repeat on other wheel.

Replace axle shaft (para 10-15).

Step 6. Check pusher axle for damaged components or leaking air lines.

Replace components as necessary (para 9-38, 10-16) or contact Direct Support Maintenance.

Table 10-1. Wheel and Tire Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

2. NOISY OR BUMPING SOUND WHILE TRAVELING ON THE ROAD (Continued):

Step 7. Inspect front driving axle (M816 thru M820) as in Step 5.

Refer to paragraph 10-14 or Direct Support Maintenance.

Table 10-2. Steering Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. FRONT TIRES WEARING UNEVENLY:

Step 1. Inspect U-bolts for tightness.

Tighten U-bolts (125-165 lb-ft (170-224 N·m) for M915;
200-270 lb-ft (271-366 N·m for M916 thru M920.

Step 2. Inspect spring shackle pins for looseness using a pry bar. No noticeable movement is allowable.

Refer to Direct Support Maintenance.

Step 3. Check wheel bearings for vertical looseness using a pry bar beneath the tire. Check for proper lubrication and damage.

Adjust, lubricate, or replace bearing (para 10-13 or 10-14, as applicable).

Step 4. Check for proper toe-in (0 to 1/8-inch).

Adjust toe-in (para 10-10).

Step 5. Check brakes for proper adjustment.

Adjust brakes (para 9-31 and 9-32).

2. HARD STEERING:

Step 1. Check oil level in power steering pump.

Fill to proper level (LO 9-2320-273-12).

Step 2. Check all steering linkage for proper lubrication.

Lubricate (LO 9-2320-273-12).

Step 3. Check U-bolts for tightness.

Tighten U-bolts (125-165 lb-ft (170-224 N·m) for M915;
200-270 lb-ft (271-366 N·m) for M916 thru M920).

Step 4. Inspect all hydraulic lines and fittings for leakage or damage.

Tighten or replace lines or fittings (para 10-22 and 10-23).

Step 5. Check tie rod for damage or loose ends. No play is allowable.

Tighten or replace (para 10-20).

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

2. HARD STEERING (Continued):

Step 6. Inspect drag link for damage.

Replace drag link (para 10-19).

Step 7. Check steering gear for proper adjustment.

Refer to Direct Support Maintenance.

Step 8. Inspect axle shaft for damage (M916 thru M920).

Refer problem to Direct Support Maintenance.

3. VEHICLE WANDERS OR PULLS TO ONE SIDE:

Step 1. Check U-bolts for tightness.

Tighten U-bolts (125-165 lb-ft (170-224 N·m) for M915, 200-270 lb-ft (271-336 N·m) for M916 thru M920).

Step 2. Check front spring pin for damage by using a pry bar. No noticeable play is allowed.

Refer to Direct Support Maintenance.

Step 3. Check auxiliary cylinder for damage (M916 thru M920).

Replace cylinder (para 10-23).

Step 4. Check drag link for damage.

Replace drag link (para 10-19).

Step 5. Check tie rod for looseness or damage.

Adjust or replace tie rod assembly (para 10-20).

Step 6. Check for dragging brake by jacking vehicle and spinning wheel by hand.

Adjust brake (para 9-31 and 9-32).

Step 7. Check hub and drum for damage.

Replace (para 10-13 or 10-14, as applicable).

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

3. VEHICLE WANDERS OR PULLS TO ONE SIDE (Continued):

Step 8. Check wheel bearing adjustment by using a pry bar. No noticeable play is allowable. Check for proper lubrication or damage.

Adjust, lubricate, or replace bearing (para 10-13 or 10-14, as applicable).

4. LOST MOTION OR EXCESSIVE PLAY IN STEERING WHEEL:

Step 1. Check free play. Tape a piece of stiff wire or weld rod to the instrument panel so that one end is near the rim of the steering wheel. Turn the wheel to one extreme of free travel (wheels do not move) and mark the wheel at the wire. Turn the wheel the other way to the end of the free play and mark the wire position on the wheel. Measure the free play around the circumference of the steering wheel. Maximum free play with engine running is 2-1/2 inches.

Refer to Direct Support Maintenance.

Step 2. Check drag link for looseness or damage.

Replace drag link (para 10-19).

Step 3. Check tie rod for damage or loose end. No free play is allowable in tie rod end.

Adjust or replace tie rod (para 10-20).

Step 4. Check pitman arm for damage.

Replace pitman arm (para 10-21).

Step 5. Check pump reservoir for damage.

Replace reservoir (para 10-22).

Step 6. Check auxiliary cylinder for damage. (M916 thru M920).

Replace cylinder (para 10-23).

5. TEMPORARY INCREASE IN EFFORT WHEN TURNING STEERING WHEEL.

Step 1. Check all steering linkage for proper lubrication.

Lubricate (LO 9-2320-273-12).

Step 2. Check hydraulic reservoir for damage and leakage.

Replace reservoir (para 10-22).

Table 10-2. Steering Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

5. TEMPORARY INCREASE IN EFFORT WHEN TURNING STEERING WHEEL (Continued):

Step 3. Check steering gear mounting bolts for tightness.

Tighten to 180 lb-ft (244 N·m).

Step 4. Check steering gear adjustment.

Refer to Direct Support Maintenance.

Step 5. Check auxiliary cylinder for damage or leakage (M916 thru M920).

Replace cylinder (para 10-23).

Step 6. Inspect drag link for damage.

Replace drag link (para 10-19).

Step 7. Inspect tie rod for damage or loose end. No play is allowable.

Replace tie rod end (para 10-20).

Step 8. (All models except M915). Inspect axle shaft for damage by jacking up both wheels, turning wheels to one extreme, and rotating one wheel by hand. Listen for rumbling or grinding sound within the axle. Repeat on other wheel.

Refer to Direct Support Maintenance.

6. VEHICLE DOES NOT FULLY STEER FROM STOP TO STOP:

Step 1. Check all steering linkage for proper lubrication.

Lubricate (LO 9-2320-273-12).

Step 2. Check pitman arm for damage.

Replace pitman arm (para 10-21).

Step 3. Check drag link for damage or looseness. No play is allowable.

Replace drag link (para 10-19).

Step 4. Check the tie rod for damage or loose end. No play is allowable.

Replace tie rod end if loose (para 10-20).

Step 5. Check steering gear mounting bolts for tightness.

a. Tighten bolts to 180 lb-ft (244 N.m).
b. Refer to Direct Support Maintenance.

Table 10-3. Suspension Troubleshooting Procedures

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

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1. VEHICLE WANDERS OR SHIMMIES:

Step 1. Check for insufficient lubrication.

Lubricate (LO 9-2320-273-12).

Step 2. Check for loose wheel stud cap nuts.

Tighten nuts to 450 lb-ft (610 N·m).

Step 3. Check for loose spring U-bolts.

Tighten nuts on U-bolts (125-165 lb-ft (170-224 N·m) for M915, 200-270 lb-ft (271-366 N·m) for M916 thru M920).

Step 4. Check wheel bearings for play using a pry bar.

Adjust or replace bearing (para 10-13 or 10-14, as applicable).

Step 5. Inspect tie rod for damage and ends for looseness. No play is allowable.

Replace tie rod end if loose (para 10-20).

Step 6. Inspect drag link for damage.

Replace drag link (para 10-19).

Step 7. Check propeller shafts and universal joints for wear and damage. Wear is indicated by any movement between the shaft and the joint in any direction.

Replace (para 8-11).

Step 8. Check spring pins for wear using a pry bar. No noticeable movement is allowed.

Refer to Direct Support Maintenance.

Step 9. (N/A M915). Check front axle shaft for damage by jacking up both wheels, turning wheels to one extreme and rotating one wheel by hand. Listen for a rumbling or grinding sound within the axle. Repeat on other wheel.

Refer to Direct Support Maintenance.

Table 10-3. Suspension Troubleshooting Procedures (Continued)

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

2. PUSHER AXLE WILL NOT RAISE OR LOWER:

Step 1. Check air bags for damage and leakage by listening for a hissing sound or using a soap solution and watching for bubbles.

Replace air bags (para 8-14).

Step 2. Check air lines for leakage using a soap solution.

Replace lines (para 8-14 and 8-15).

Step 3. Check lifting bags for damage.

Replace defective bags (para 8-15).

Step 4. Inspect all brackets and connecting arms for bends or other damage.

Refer to Direct Support Maintenance.

Step 5. Check control valves for damage and leakage using a soap solution with valve under pressure. A 1-inch bubble in 5 seconds is permissible.

Tighten connections and/or replace the control valves (para 8-17 pusher axle pressure regulator valve, or para 8-18 pusher axle up-down selector valve).

Step 6. Check shock absorbers for damage and tight mounting.

Tighten or replace (para 10-25).

3. REAR AXLE ASSEMBLY NOT TRACKING PROPERLY:

Step 1. (M915, M916, M920). Check fifth wheel for secure mounting. This step applies only if a trailer is attached.

Tighten, refer to torque table, para 3-9.

Step 2. Check torque rod for security and damage.

Tighten (105 lb-ft (142 N·m) for the M915, 180 lb-ft (244 N·m) for the M916 thru M920), or replace (para 10-26).

Step 3. Check for dragging brake by jacking vehicle and rotating wheels by hand.

Adjust or replace (para 9-33, 9-34). Refer to Direct Support Maintenance.

Table 10-3. Suspension Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

3. REAR AXLE ASSEMBLY NOT TRACKING PROPERLY (Continued):

Step 4. Check wheel bearing adjustment using a pry bar. No noticeable movement is allowable. Check for damage and proper lubrication.

Adjust, lubricate, or replace (para 10-15 or 10-16).

Step 5. Check hubs and drums for damage.

Replace (para 10-15 or 10-16).

Section III MAINTENANCE PROCEDURES

10-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the wheels, steering, and suspension systems. To find a specific maintenance procedure, see one of the following task summaries:

a. Wheels and Tires (para 10-7).

b. Steering Mechanism (para 10-8).

c. Suspension System (para 10-9).

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10-7. WHEEL AND TIRE MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
All.	(See TM 9-2320-273-10.)	Wheel and Tire Assembly Removed.
	(See TM 9-2320-273-10.)	Axle Jacked Up.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Toe-In Gage.
Ball Joint Puller.

MATERIALS/PARTS (P/N)

Soap Solution.
Hub Gasket, 2208-M-819 (78500).
Bearing Seal, A-1205-L-1338 (78500).
GAA (Refer to Appendix C).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
Seal Installer.
Wheel Bearing Packing Tool.
Wheel Dolly.
Wheel Bearing Nut Wrench.
Permatex (Refer to Appendix C).
Silicone (RTV) Gasket Material (Refer to Appendix C).
Cotter Pin (2) K-2616 (78500).
Inner Bearing Seal, 1205-P-1212 (78500).
Hub Cap Gasket, 2208-P-796 (78500).
Oil Seal, A-1205-Y-1533 (78500).
Inner Bearing Seal M915, A-1205-T-696 (78500).
M916/M920, A-1205-T-774 (78500).
Outer Bearing Seal M915, A1205-N-612 (78500).
M916/M920, A-1205-U-619 (78500).
Star Washers (16), 1229-X-518 (78500).
Gasket (2) M915, 2208-X-440 (78500).
M916/M920, 2208-W-413 (78500).
Brass Drift.

PERSONNEL REQUIRED

One or Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 10-1, 10-2, 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Wheels Blocked.
Engine OFF.
Transmission in Neutral.
Park Brake Set

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Front Wheels Maintenance:	10-10	10-1
	A. Checking Alinement.	10-10A	
	B. Adjustment of Alinement (M915).	10-10B	
	C. Adjustment of Alinement (M916 thru M920).	10-10C	
2.	Tire and Tube Maintenance (M915):	10-11	10-1
	A. Removal.	10-11A	
	B. Inspection.	10-11B	
	C. Installation.	10-11C	

10-7. WHEEL AND TIRE MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Tire and Tube Maintenance (M916 thru M920):	10-12	10-1
	A. Removal.	10-12A	
	B. Inspection.	10-12B	
	C. Installation.	10-12C	
4.	Front Wheel Bearings and Seals Maintenance (M915):	10-13	10-2
	A. Removal.	10-13A	
	B. Inspection.	10-13B	
	C. Packing and Installation of Bearings.	10-13C	
5.	Front Wheel Bearings and Seals Maintenance (M916 thru M920):	10-11	10-2
	A. Removal.	10-14A	
	B. Inspection.	10-14B	
	C. Packing and Installation of Bearings.	10-14C	
6.	Rear Wheel Bearings, Shafts, and Seals Maintenance:	10-15	10-3
	A. Removal.	10-15A	
	B. Inspection.	10-15B	
	C. Packing and Installation of Bearings.	10-15C	
7.	Pusher Axle Bearings and Seals:	10-16	10-3
	A. Removal.	10-16A	
	B. Inspection.	10-16B	
	C. Packing and Installation of Bearings.	10-16C	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
5-67A.	Horn Button Assembly Removed.
11-14A or C.	Front Fenders Removed.
11-16A.	Grille Removed.
5-37A.	Batteries Disconnected.
4-18A.	Fuel Filter and Adapter Removed. (M916 thru M920).

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
Cotter Pin, 103415 (24617).
Cotter Pin, 103389 (24617).
Snapring, 100475 (15434).
Gasket, Oil Pump to Adapter (5330-01-071-5727).
O-Ring, 008771-026 (19954).
Wheel Puller.
Silicone RTV Sealant (Refer to Appendix C).
Cotter Pin (2), K-2616 (78500).
Balljoint Puller.
Jack Stands.
Power Steering Fluid (Refer to Appendix C).
Liquid Teflon (Refer to Appendix C).
Clean Container (Quart).
Grease Gun.
Plugs.
Cable Tie, PLT4H-MO (06383).
Cable Tie, MS-3367-2-0 (96906).

PERSONNEL REQUIRED

One or Two MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 10-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Steering Wheel Maintenance:	10-17	10-2
	A. Removal.	10-17A	
	B. Installation.	10-17B	
	C. Operational Check.	10-17C	
2.	Lower Steering Shaft Maintenance:	10-18	10-2
	A. Removal.	10-18A	
	B. Disassembly.	10-18B	
	C. Assembly.	10-18C	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Lower Steering Shaft Maintenance (Continued):		
	D. Installation.	10-18D	
	E. Operational Check.	10-18E	
3.	Drag Link Maintenance:	10-19	10-2
	A. Removal.	10-19A	
	B. Inspection of Mating Connections.	10-19B	
	C. Installation.	10-19C	
	D. Operational Check.	10-19D	
4.	Tie Rod Maintenance:	10-20	10-2
	A. Removal.	10-20A	
	B. Inspection.	10-20B	
	C. Installation.	10-20C	
5.	Pitman Arm Maintenance:	10-21	10-2
	A. Removal.	10-21A	
	B. Inspection of Mating Surfaces.	10-21B	
	C. Installation.	10-21C	
6.	Hydraulic Power Steering Pump and Cooler Maintenance:	10-22	10-2
	A. Removal.	10-22A	
	B. Inspection of Lines, Fittings, and Cooler.	10-22B	
	C. Installation.	10-22C	
	D. Filling and Bleeding System.	10-22D	
	E. Operational Check.	10-22E	

10-8. STEERING MECHANISM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Auxiliary Cylinder (M916 Thru M920):	10-23	10-2
	A. Removal.	10-23A	
	B. Inspection.	10-23B	
	C. Installation.	10-23C	
	D. Operational Check.	10-23D	

10-9. SUSPENSION SYSTEM MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
All.	None.	None.

TEST EQUIPMENT

None.

TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Shock Absorbers (2) (2540-00-740-9617).
Rubber Bushings (8) (6365-00-740-9618).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).
Shock Absorbers (2) (2540-01-011-0614).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

Table 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Front Axle Shock Absorbers Maintenance (M915):	10-24	10-3
	A. Removal.	10-24A	
	B. Cleaning and Inspection.	10-24B	
	C. Installation.	10-24C	

10-9. SUSPENSION SYSTEM MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Pusher Axle Shock Absorbers Maintenance:	10-25	10-3
	A. Removal.	10-25A	
	B. Cleaning and Inspection.	10-25B	
	C. Installation.	10-25C	
3.	Torque Rods Maintenance:	10-26	10-3
	A. Removal (M915).	10-26A	
	B. Removal (M916 Thru M920).	10-26B	
	C. Cleaning and Inspection (All).	10-26C	
	D. Installation (M915).	10-26D	
	E. Installation (M916 Thru M920).	10-26E	

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10-10. FRONT WHEELS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Checking Alinement.	(10)
b. Adjustment of Alinement (M915).	
c. Adjustment of Alinement (M916 thru M920).	(25)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Toe-In Gage.
Ball Joint Puller.

MATERIALS/PARTS (P/N)

Cotter Pin (2) K-2616 (78500).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 10-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

WHEELS AND TIRES.

10-10. FRONT WHEELS MAINTENANCE (Continued).

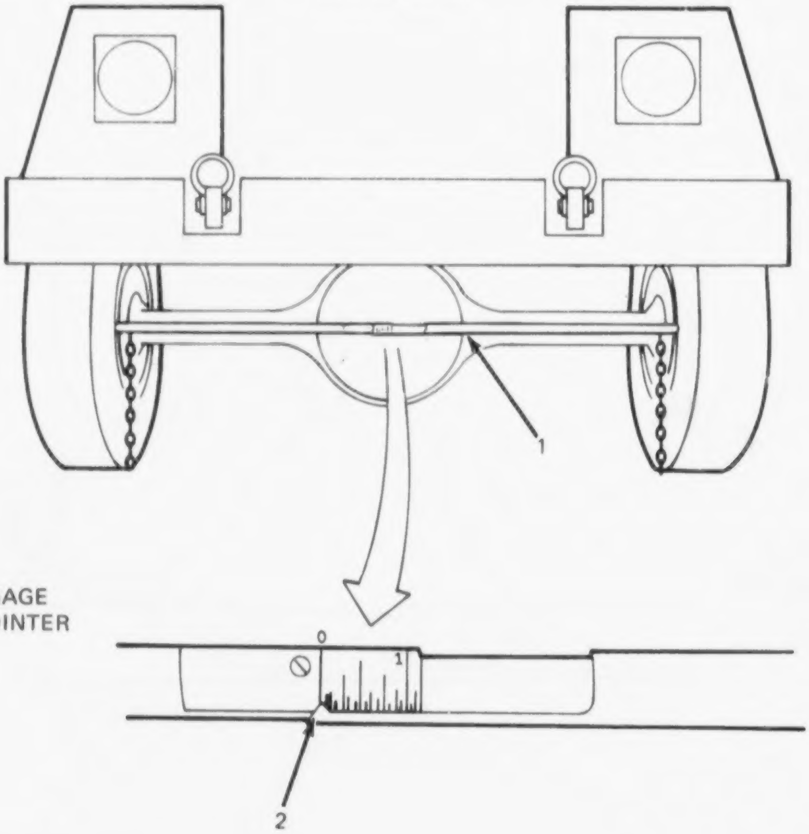
LOCATION/ITEM	ACTION	REMARKS

NOTE

Before checking or adjusting toe-in, be sure tires are properly inflated (see TM 9-2320-273-10). Truck should be parked in a level area. When parking truck, straighten wheels and pull straight forward for final fifteen feet.

A. CHECKING ALINEMENT.

LOCATION/ITEM	ACTION	REMARKS
1. Front wheels - front side.	a. Place toe-in gage (1) between wheels on front side. Chain should just touch ground.	See illustration below.



LEGEND:

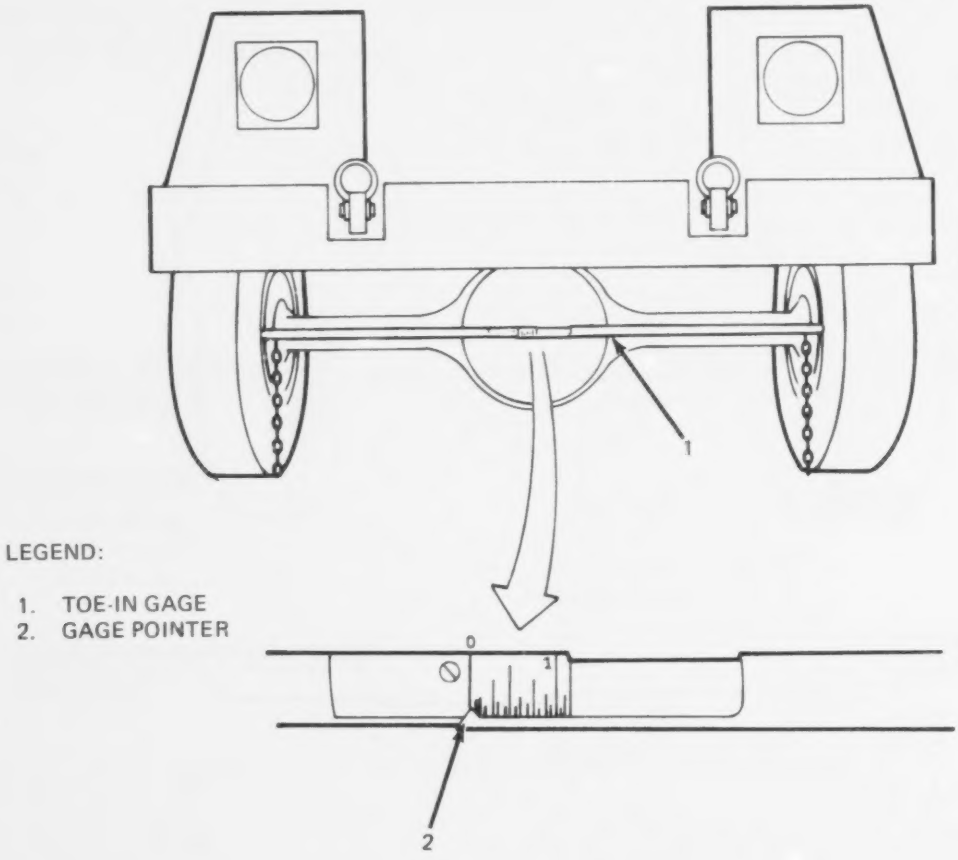
1. TOE-IN GAGE
2. GAGE POINTER

TA 074970

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. CHECKING ALINEMENT (Continued).		
	b. Set gage pointer (2) to zero.	See illustration below.
	c. Remove gage.	
2. Front wheels – back side.	a. Place gage between front wheels on back side. Chains should just touch ground.	
	b. Gage should read 0-1/8 inch (0-3.175 mm). Adjust toe-in (step B) if necessary.	



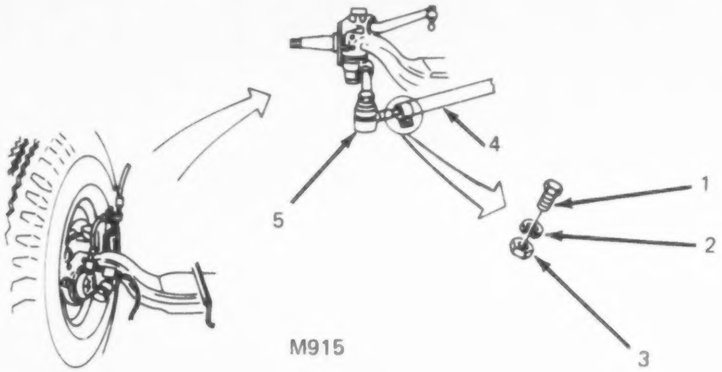
TA 074971

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).

B. ADJUSTMENT OF ALINEMENT (M915).

LOCATION/ITEM	ACTION	REMARKS
3. Two bolts (1), lockwashers (2), and clamp nuts (3).	Loosen.	
4. Tie rod (4).	Screw further onto ball joint (5) to decrease toe-in. Unscrew to increase toe-in.	
5. Front wheels.	a. Check toe-in (para A). b. Repeat adjustment procedure until toe-in is 1/16 ± 1/16 inch (1.6 ± 1.6 mm).	
6. Two bolts (1), lockwashers (2), and clamp nuts (3).	Tighten clamp nut to 40-55 lb-ft (54-68 N·m).	



LEGEND:

1. BOLT (2)
2. LOCKWASHER (2)
3. CLAMP NUT (2)
4. TIE ROD
5. BALL JOINT

TA 074972

10-10. FRONT WHEEL MAINTENANCE (Continued).

C. ADJUSTMENT OF ALINEMENT (M916 THRU M920).

NOTE

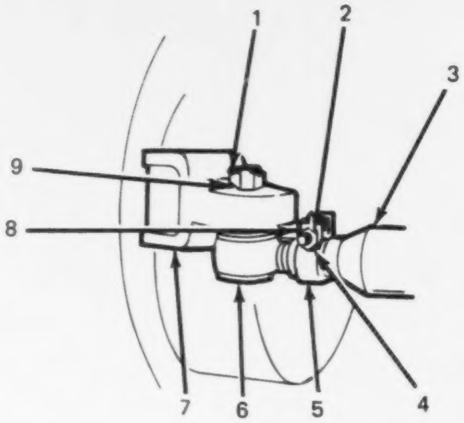
Do one end at a time because you have to drop the tie rod to adjust.

LOCATION/ITEM	ACTION	REMARKS
7. Bolt (2), lockwasher (8) and clamp locknut (4).	Loosen from clamp (5).	
8. Cotter pin (1) and castellated nut (9).	Remove from top stud of ball joint (6).	
9. Ball joint (6).	a. Use ball joint puller and remove from steering knuckle (7), or tap with rawhide hammer. b. Screw ball joint in to tie rod (3) to decrease toe-in and out to increase toe-in. c. Repeat adjustment procedure until toe-in is 1/16 + 1/16 inch (1.6 + 1.6 mm).	
10. Bolt (2), lockwasher (8) and clamp locknut (4).	Torque to 40-55 lb-ft (54-68 N·m).	
11. Ball joint (6).	Install back into steering knuckle (7).	
12. Castellated nut (9).	a. Install on top stud of ball joint (6). b. Torque to 110-125 lb-ft (149-169 N·m).	
13. Cotter pin (1).	Insert new cotter pin through nut (9) and top ball joint stud; then bend ends over.	

WHEELS AND TIRES.

10-10. FRONT WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. COTTER PIN
2. BOLT
3. TIE ROD
4. LOCKNUT
5. CLAMP
6. BALL JOINT
7. STEERING KNUCKLE
8. LOCKWASHER
9. CASTELLATED NUT

M916 THRU M920

TA 074973

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a.	Removal.	(20)
b.	Inspection.	(10)
c.	Installation.	(30)
		60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10.)	Wheel and Tire Assembly Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 10-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

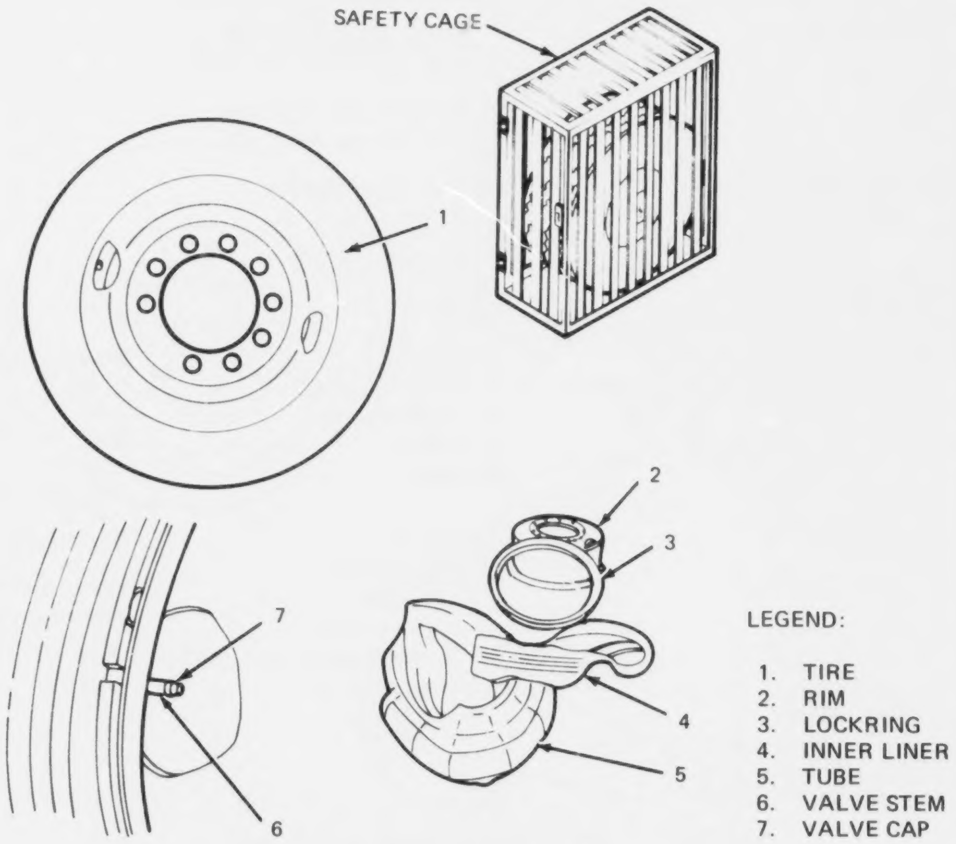
10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Always remove the valve core and exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components, or any wheel components, such as nuts and rim clamps.

Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.


SAFETY CAGE
1
2
3
7
4
5
6
LEGEND:
1. TIRE
2. RIM
3. LOCKRING
4. INNER LINER
5. TUBE
6. VALVE STEM
7. VALVE CAP

M915 CONFIGURATION

TA 074974

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Valve cap (7).	Remove.	Cap can also be used to remove core.
2. Valve stem (6).	Remove core with valve core removing tool or valve cap.	
3. Tire (1).	Use gooseneck tool to free tire bead from lockring (3) all around tire.	A heavy soft headed mallet may be helpful in breaking tire loose from lockring.
4. Lockring (3).	Use rim tool to pry lockring (3) free from rim (2).	
5. Tire (1) and rim (2) assembly.	a. Turn over. b. Use gooseneck tool to separate second tire bead from rim. c. Remove tire (1), inner liner (4) and tube (5).	
6. Tube (5) and inner liner (4).	Remove from tire (1).	
B. INSPECTION.		
7. Tire (1), tube (5) and inner liner (4).	Inspect for: a. Excessive wear. b. Uneven wear. c. Cracks. d. Leaks.	Replace, if necessary, or repair. See TM 9-2610-200-20 for information on pneumatic tires and tubes.
8. Rim (2).	Inspect for: a. Rust streaks. b. Corrosion. c. Cracked rims. d. Damaged threads on studs. e. Wheel cracks.	Replace, if necessary. For rust streaks or corrosion, wire brush and repaint.

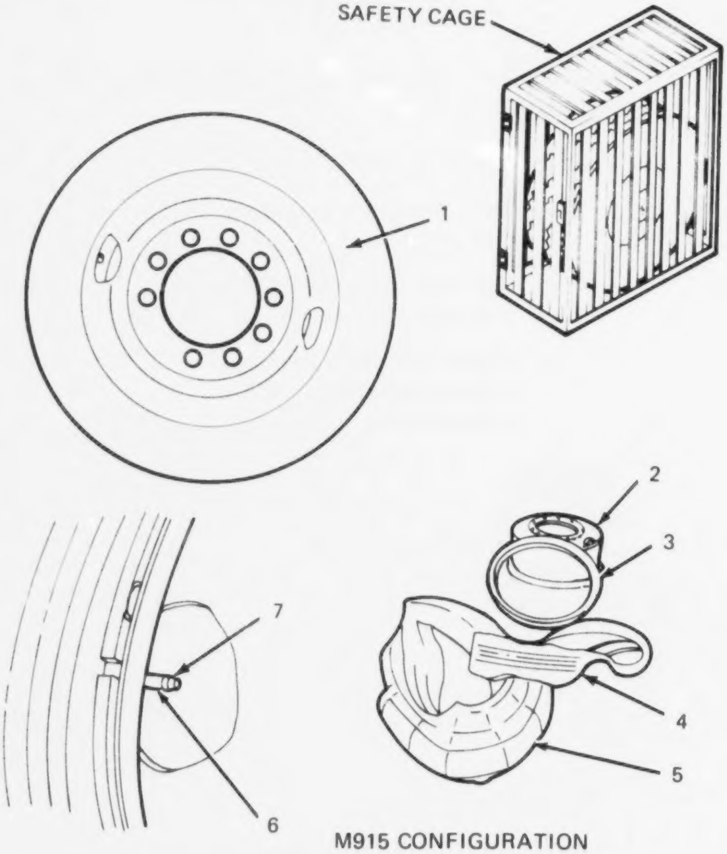
10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS

C. INSTALLATION.

WARNING

Mismatched tires will make truck handle poorly and may cause accidents. All tires on an axle should have the same diameter, ± 1/8 inch (3.2 mm). When replacing a tire, measure it and the other tires on the axle to be sure that the distances from top to bottom do not vary by more than 1/4 inch (6.4 mm). Use a depth gage to measure tires.



LEGEND:

1. TIRE
2. RIM
3. LOCKRING
4. INNER LINER
5. TUBE
6. VALVE STEM
7. VALVE CAP

M915 CONFIGURATION

TA 074975

WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued):		
9. Tire (1), tube (5), rim (2) and inner liner (4).	a. Place tube in tire.	
	b. Place liner over tube.	
	c. Lubricate both beads of tire with soap solution and, using gooseneck tool, work both tire beads onto rim.	
	d. Place valve stem (6) through hole in rim.	Rim should be laying with outer side on top.
10. Lockring (3).	Set in place.	

CAUTION

Heavy hammer blows will damage rim. Tap bead into rim gently.

LOCATION/ITEM	ACTION	REMARKS
11. Lockring (3).	a. Insert one end into rim (2).	
	b. Walk along ring to push it into place.	
	c. Tap final few inches into rim with hammer.	
	d. Check to be sure that ring is securely seated all the way around.	

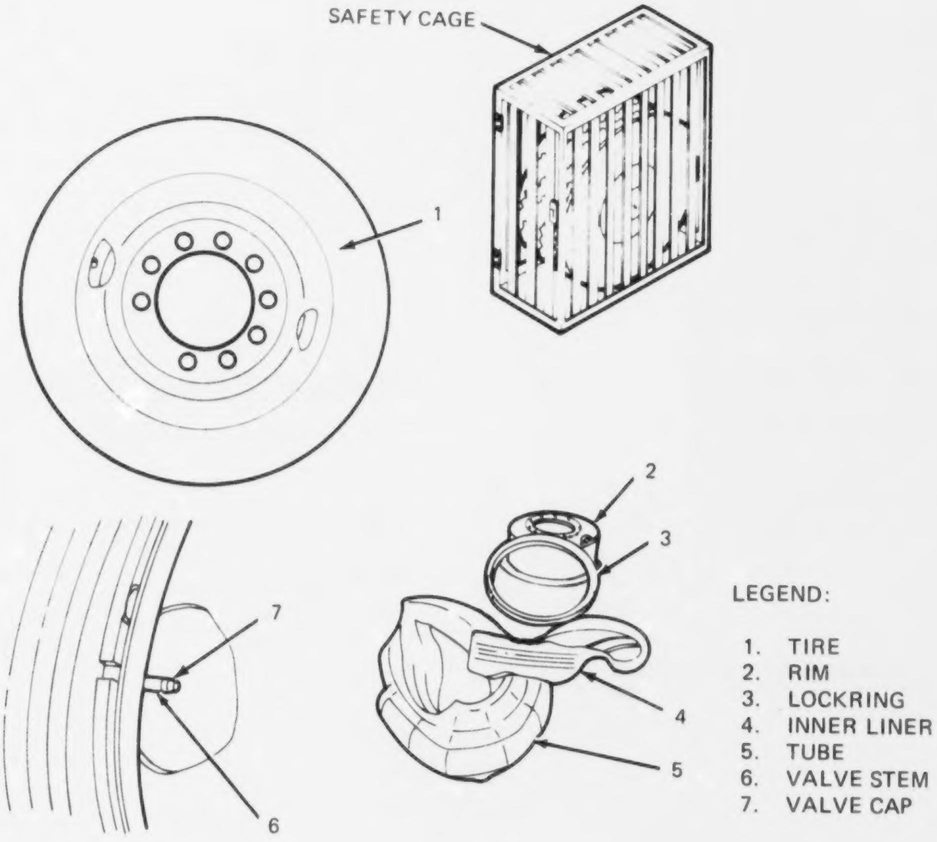
WHEELS AND TIRES.

10-11. TIRE AND TUBE MAINTENANCE (M915) (Continued).

WARNING

When inflating tires (wheel removed from vehicle) always use safety cage to prevent injury if ring should fly off.

LOCATION/ITEM	ACTION	REMARKS
12. Tire and wheel assembly.	a. Place in safety cage and inflate. b. Install valve cap. c. Mount on truck (see TM-9-2320-273-10).	


SAFETY CAGE
1
2
3
7
4
5
6
LEGEND:
1. TIRE
2. RIM
3. LOCKRING
4. INNER LINER
5. TUBE
6. VALVE STEM
7. VALVE CAP

TA 074976

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Inspection.	(10)
c. Installation.	(30)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Soap Solution.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 10-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2370-273-10).	Wheel and Tire Assembly Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

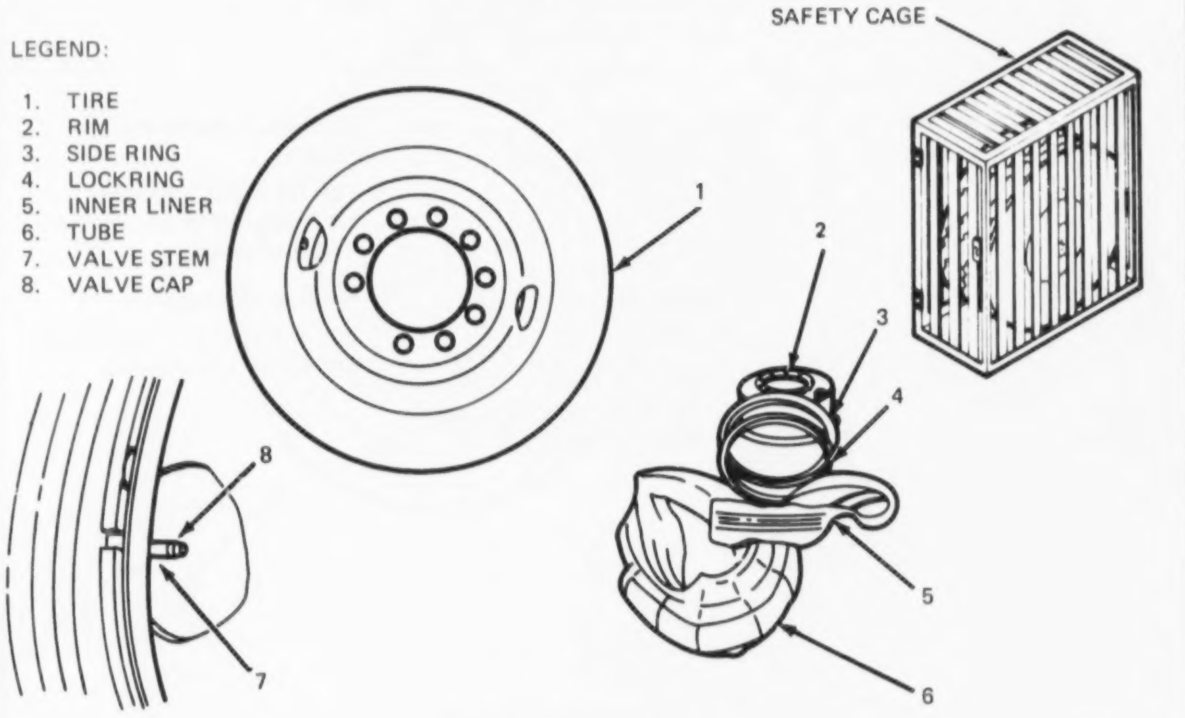
WARNING

Always remove the valve core and exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components, or any wheel components, such as nuts and rim clamps.

Check the valve stem by running a piece of wire through the stem to make sure it is not plugged.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Valve cap (8).	Remove.	Cap can also be used to remove core.
2. Valve stem (7).	Remove core with valve core removing tool, or valve cap.	


LEGEND:
1. TIRE
2. RIM
3. SIDE RING
4. LOCKRING
5. INNER LINER
6. TUBE
7. VALVE STEM
8. VALVE CAP
SAFETY CAGE
1
2
3
4
5
6
7
8

M916-M920 CONFIGURATION

TA 074977

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Tire (1).	Use gooseneck tool to free tire bead from side ring all around tire.	A heavy soft headed mallet may be used in breaking tire loose from ring.
4. Lockring (4) and side ring (3).	a. Use rim tool to pry side ring (3) free from rim (2). b. Remove both rings.	
5. Tire (1) and rim (2).	a. Turn over. b. Use gooseneck tool to separate second tire bead from rim. c. Remove tire (1), inner liner (5) and tube (6).	
6. Tube (6) and inner liner (5).	Remove from tire (1).	
B. INSPECTION.		
7. Tire (1) tube (6) and inner liner (5).	Inspect for: a. Excessive wear. b. Uneven wear. c. Cracks. d. Leaks.	Replace, if necessary, or repair. See TM 9-2610-200-20 for information on pneumatic tires and tubes.
8. Rim (2).	Inspect for: a. Rust streaks. b. Corrosion. c. Cracked rims. d. Damaged threads on studs. e. Wheel cracks.	Replace, if necessary. For rust streaks or corrosion, wire brush and repaint.

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

C. INSTALLATION.

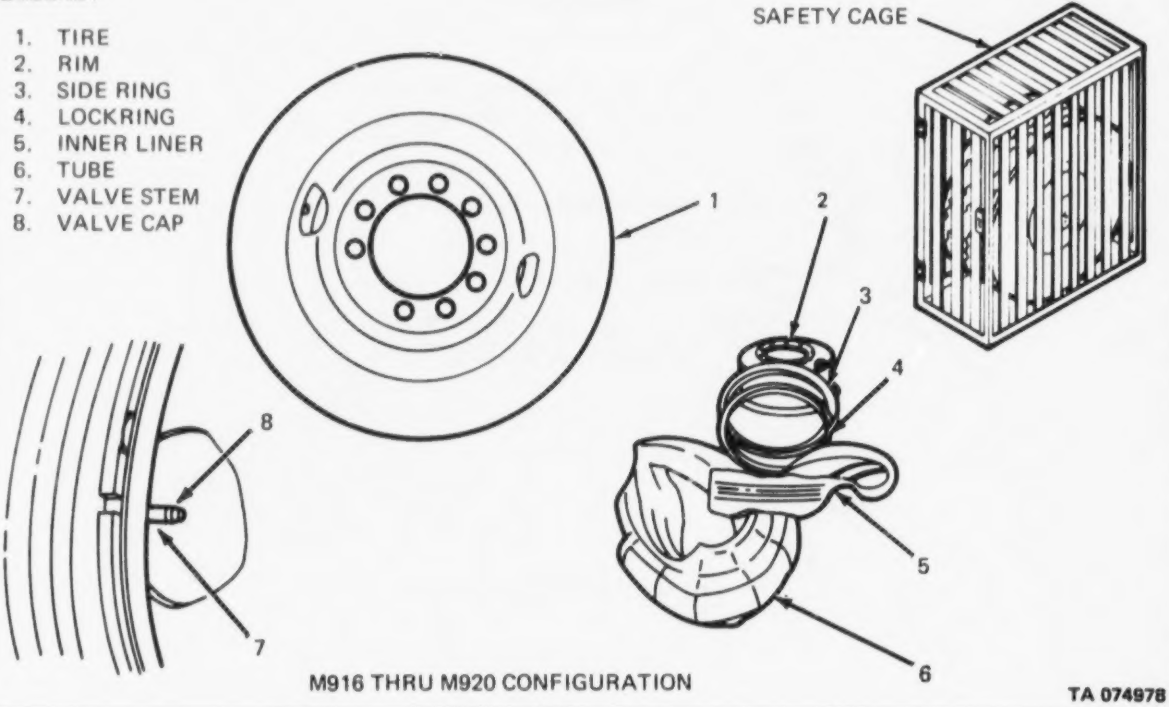
WARNING

Mismatched tires will make truck handle poorly and may cause accidents. All tires on an axle should have the same diameter, ± 1/8 inch (3.2 mm) when replacing a tire, measure it and the other tires on the axle to be sure that the distances from top to bottom do not vary by more than 1/4 inch (6.4 mm). Use a depth gage to measure tires.

LOCATION/ITEM	ACTION	REMARKS
9. Tire (1), tube (6), rim (2), and inner liner (5).	a. Place tube in tire.	
	b. Place liner over tube.	
	c. Lubricate both beads of tire with soap solution.	
	d. Place valve stem (7) through hole in rim.	Rim should be laying with outer side on top.

LEGEND:

1. TIRE
2. RIM
3. SIDE RING
4. LOCKRING
5. INNER LINER
6. TUBE
7. VALVE STEM
8. VALVE CAP



M916 THRU M920 CONFIGURATION

TA 074978

WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
	CAUTION Heavy hammer blows will damage rim. Tap bead into rim gently.	
10. Lockring (4).	a. Insert one end into rim (2). b. Walk along ring to push it into place. c. Tap final few inches into gutter with hammer. d. Check to be sure that ring is securely seated all the way around. e. Install side ring (3).	
	WARNING When inflating tires (wheel removed from vehicle) always use a safety cage to prevent injury if ring should fly off.	
11. Tire and wheel assembly.	a. Place in safety cage and inflate. b. Install valve cap. c. Mount on truck (see TM 9-2320-273-10).	

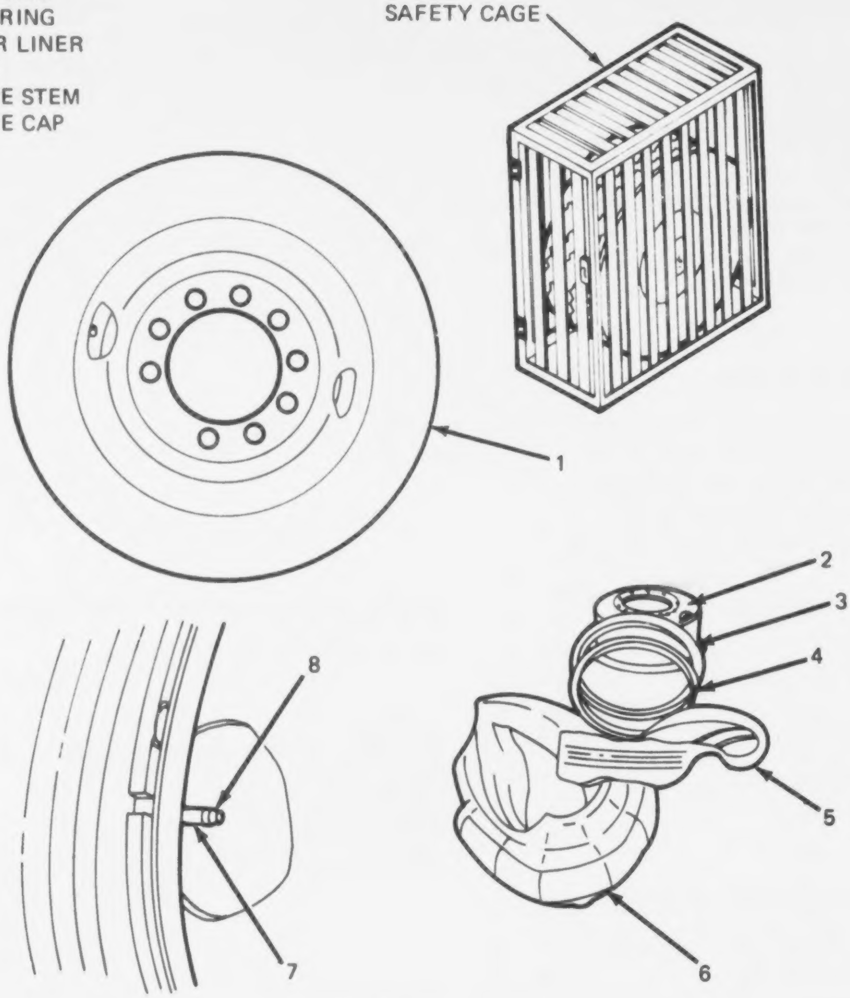
WHEELS AND TIRES.

10-12. TIRE AND TUBE MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. TIRE
2. RIM
3. SIDE RING
4. LOCKRING
5. INNER LINER
6. TUBE
7. VALVE STEM
8. VALVE CAP



M916-M920 CONFIGURATION

TA 074979

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Inspection.	(5)
c. Packing and Installation of Bearings.	(30)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Outside Wheel Bearing Nut Wrench, P/N 1920 (45152) NSN 5120-01-089-9068.
Inside Wheel Bearing Nut Wrench, P/N 1922 (45152) NSN 5120-01-112-0593.

MATERIALS/PARTS (P/N)

Seal Installer.
Wheel Bearing Packing Tool.
Hub Gasket, 2208-M-819 (78500).
Bearing Seal, A-1205-L-1338 (78500).
GAA (Refer to Appendix C).
Washer.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10).	Axle Jacked-Up.
(See TM 9-2320-273-10).	Wheel and Tire Assembly Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

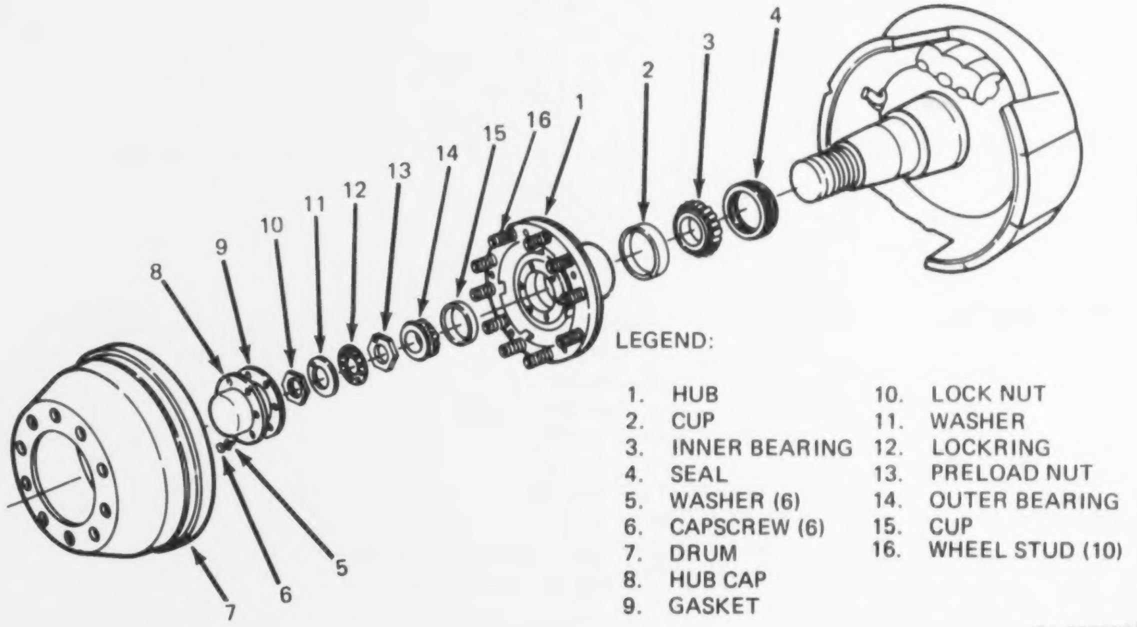
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission in Neutral.
Park Brake Set.
Wheel Blocked.

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Drum (7).	Remove.	It may be necessary to tap with hammer to break drum loose.
2. Six capscrews (6) and washers (5)	Unscrew and remove.	
3. Hub cap (8) and gasket (9)	a. Remove. b. Throw gasket away.	
4. Nut (10), washer (11), and lockring (12).	Remove.	Install new washer (11).
5. Nut (13).	Remove.	
6. Outer Bearing (14).	Remove.	
7. Hub (1).	a. Remove. b. Damaged wheel studs (16) can be removed with an arbor press and a new stud pressed in.	



LEGEND:

1. HUB	10. LOCK NUT
2. CUP	11. WASHER
3. INNER BEARING	12. LOCKRING
4. SEAL	13. PRELOAD NUT
5. WASHER (6)	14. OUTER BEARING
6. CAPSCREW (6)	15. CUP
7. DRUM	16. WHEEL STUD (10)
8. HUB CAP	
9. GASKET	

TA 237235

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

A. REMOVAL (Continued).

LOCATION/ITEM	ACTION	REMARKS
8. Seal (4) and inner bearing (3).	Remove and throw seal away.	Tap out from inside of hub (1) using hammer and wood block.
9. Cup (2).	Remove.	
10. Cup (15).	Remove.	

NOTE

Clean all component parts with SD-2 solvent.

WARNING

Do not use compressed air to clean bearings.

B. INSPECTION.

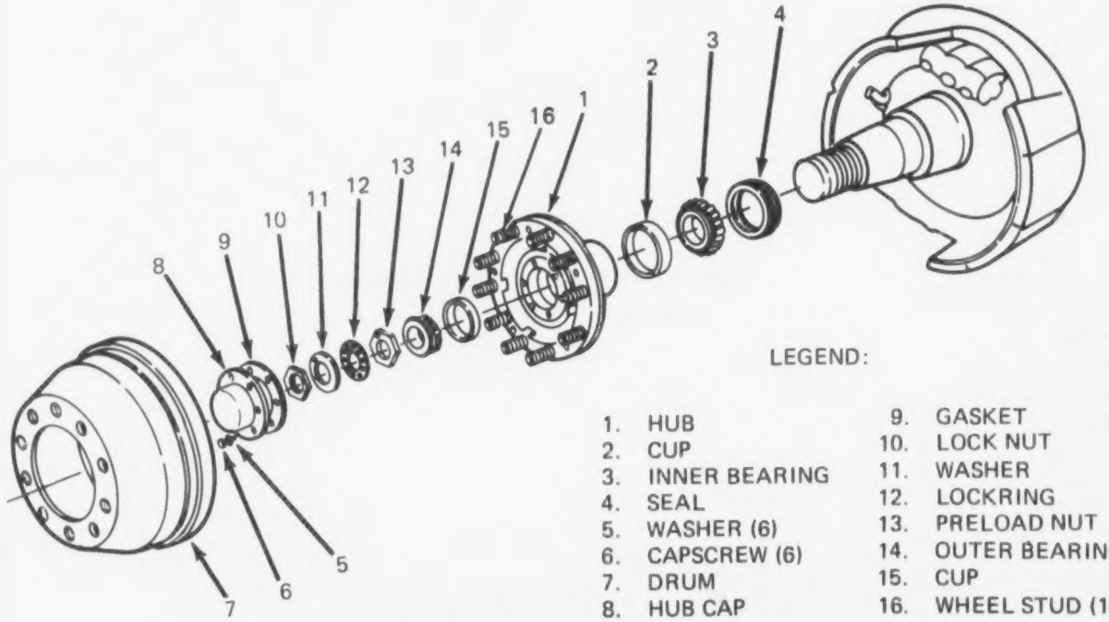
LOCATION/ITEM	ACTION	REMARKS
11. Inner bearing (3) and outer bearing (14).	Inspect for: a. Flat spots or chips in bearing rollers. b. Cracks. c. Breaks. d. Smooth operation. e. Discoloration.	Replace as necessary.
12. Cups (2) and (15).	Inspect for: a. Flat spots. b. Cracks. c. Gouges. d. Discoloration.	Replace as necessary.
13. Axle spindle.	Inspect for: a. Grooves. b. Gouges. c. Abnormal wear. d. Discoloration.	Notify Direct Support Maintenance.

NOTE

All component parts must be clean and free of all dirt and foreign matter.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
14. Inner bearing (3) and outer bearing (14).	Use bearing packing tool and pack bearings. If packing tool is not available, bearings may be hand packed.	
15. Cup (2).	Place in hub (1).	
16. Inner bearing (3).	Place in cup (2).	
17. Seal (4).	Tap new seal in hub (1), using a seal installer.	Lettering on seal should face truck.
18. Cup (15).	Place in hub (1).	
19. Hub (1).	Place in axle spindle.	
20. Outer bearing (14).	Place in cup (15).	



LEGEND:

1. HUB
2. CUP
3. INNER BEARING
4. SEAL
5. WASHER (6)
6. CAPSCREW (6)
7. DRUM
8. HUB CAP
9. GASKET
10. LOCK NUT
11. WASHER
12. LOCKRING
13. PRELOAD NUT
14. OUTER BEARING
15. CUP
16. WHEEL STUD (10)

TA 237236

WHEELS AND TIRES.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
21. Preload nut (13).	a. Install the preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N.m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N.m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N.m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	Alining pin must face out.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

C. PACKING AND INSTALLATION OF BEARINGS (Continued).

LOCATION/ITEM	ACTION	REMARKS
22. Lockring (12).	Install.	Adjust nut (13) to slip into nearest hole in lockring (12).
23. Washer (11).	Slide over axle.	
24. Locknut (10).	a. Install. b. Torque to 125 lb-ft (169.5 N.m).	
25. Washer (11).	Bend tabs over nut (10).	
26. Deleted.		
27. Gasket (9) and hubcap (8).	Align with hub (1).	
28. Six capscrews (6) and washers (5).	a. Install. b. Torque to 9-12 lb-ft (12-16 N·m).	See inset for sequence.
29. Drum (7).	Place over hub (1) and seat into position by installing two nuts equally spaced, then remove nuts and install tire and wheel assembly. Reinstall lug nuts and torque lug nuts to 450 lb-ft (610 N·m) (see TM 9-2320-273-10).	Lug nuts on left side of vehicle are left-handed threads.
30. Remove jack.	Road test vehicle.	

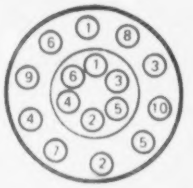
NOTE

Follow-on maintenance action required:

Install wheel and tire, road test vehicle, refer to TM 9-2320-273-10.

10-13. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M915) (Continued).

LOCATION/ITEM	ACTION	REMARKS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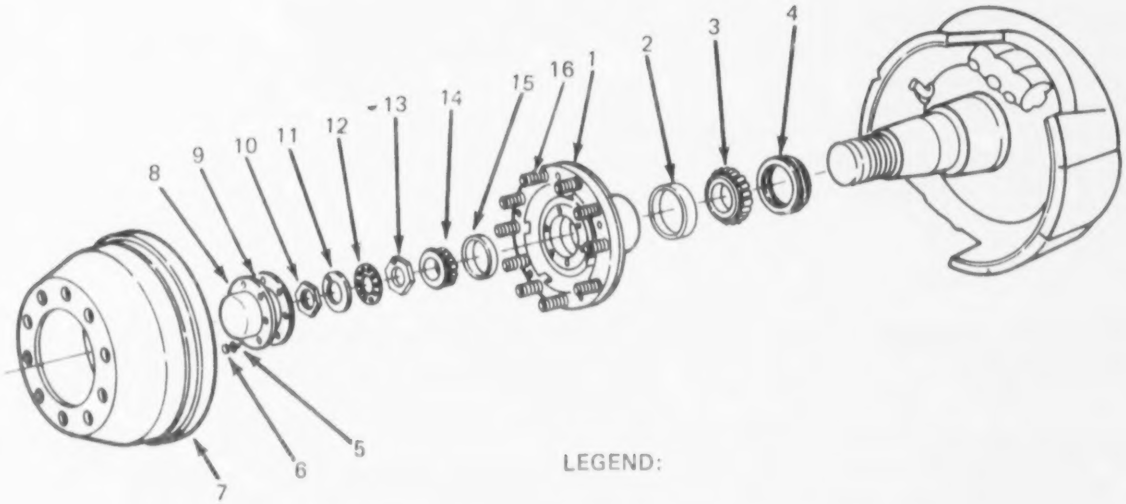
TORQUE SEQUENCE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LEGEND:

1. HUB
2. CUP
3. INNER BEARING
4. SEAL
5. WASHER (6)
6. CAPSCREW (6)
7. DRUM
8. HUB CAP
9. GASKET
10. LOCK NUT
11. WASHER
12. LOCKRING
13. PRELOAD NUT
14. OUTER BEARING
15. CUP
16. WHEEL STUD (10)

TA 237237

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(25)
b. Inspection of Bearings.	(5)
c. Packing and Installation of Bearings.	(30)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Wheel Bearing Nut Wrench, PN 1919 (45152)
Part of Wrench Set, NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Wheel Dolly.
Wheel Bearing Nut Wrench.
Permatex (Refer to Appendix C).
Silicone (RTV) Gasket Material (Refer to Appendix C).
Oil Seal, A-1205-Y-1533 (78500).
GAA (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(see TM 9-2320-273-10).	Front Axle Jacked Up.
(see TM 9-2320-273-10).	Wheel Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

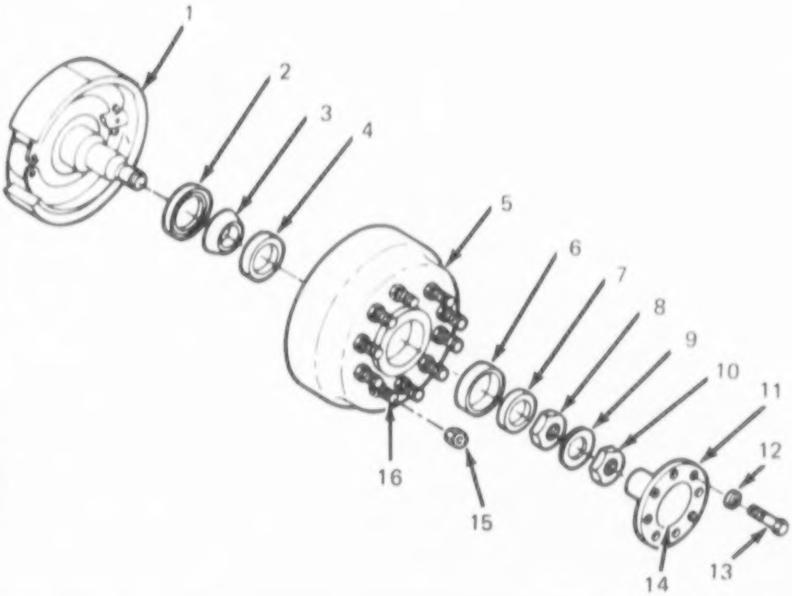
10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

WARNING

Block rear wheels of truck to keep it from rolling. Block up axle so that truck will not fall if jacks give way.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
Eight capscrews (13) and washers (12).	Unscrew and remove.	
2. Drive flange (11).	a. Remove.	Several blows with a hammer may be needed to loosen drive flange. Do not hit studs.
	b. Drive out expansion plug (14) with hammer and punch.	Replace expansion plug (14) only if damaged.



LEGEND:

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237238

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Jam Nut (10), retainer (9), and bearing adjusting nut (8).	Use wheel bearing nut wrench to remove.	
	NOTE Outer bearing cone (7) is loose and will will drop out when hub is removed and shook.	
4. Hub and drum assembly (5).	Remove.	
5. Oil seal (2), and inner bearing cone (3).	a. Remove. b. Throw away oil seal (2).	
6. Inner and outer bearing cups (4) and (6).	a. Clean and inspect these items. If discoloration or pitting is noted, refer problem to DS/GS, as inner and outer bearings cups (4) and (6) must be pressed out and in.	
	b. Damaged wheel studs (15) can be pressed out and installed with an arbor press.	Wheel studs (15) on left side of vehicle will have LH threads and RH threads on right side of vehicle.
B. INSPECTION OF BEARINGS.		
7. Inner and outer bearing cones (3) and (7).	a. Inspect for:	
	1. Missing rollers.	Replace if necessary.
	2. Flat, chipped, or pitted surfaces.	
	3. Secure fit.	
	b. If bearings are to be reused: 1. Remove surface oil and gum deposits. 2. Soak in hot oil (140°F, 60°C) to loosen hardened oil and grease. 3. Wipe dry. Do not use compressed air. 4. Coat with a light film of oil. Wrap bearings in paper until you are ready to install.	See TM 9-214 fpr information on maintenance of bearings.

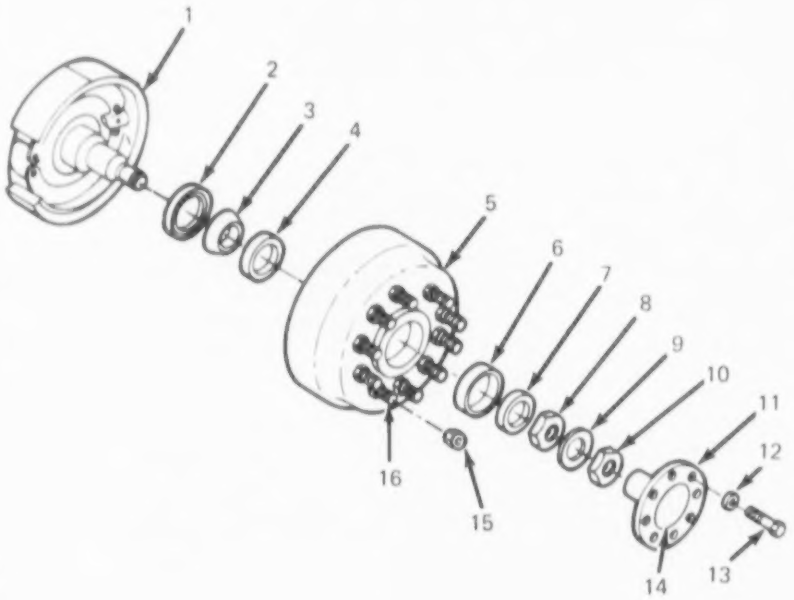
10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920)(Continued).

C. PACKING AND INSTALLATION OF BEARINGS.

LOCATION/ITEM	ACTION	REMARKS
8. Inner bearing cone (3).	a. Use bearing packing tool to pack with grease, or pack by hand.	
	b. Place in hub and drum assembly (5) so that smaller end will point away from truck.	
9. New oil seal (2).	Place in hub and drum assembly (5).	

CAUTION

Do not use excessive pressure to install seal. Do not tap seal after it has bottomed. These actions will crush the set sleeve and damage the seal.



LEGEND:

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237239

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

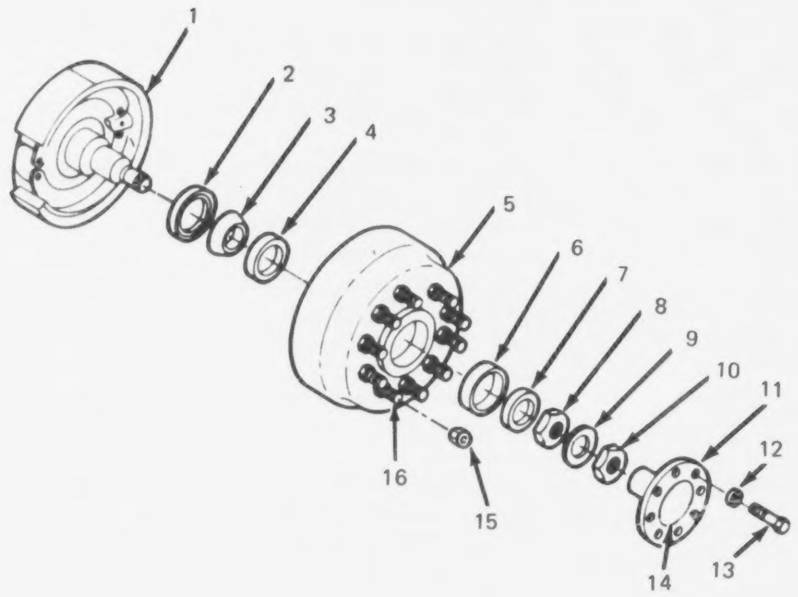
C. PACKING AND INSTALLATION OF BEARINGS (Continued).

LOCATION/ITEM	ACTION	REMARKS
	CAUTION Be careful not to damage oil seal (2) as you install the hub and drum assembly.	
10. Hub and drum assembly (5).	a. Mount assembly on spindle (1). b. Press hub until inner bearing cone (3) is seated flush on spindle.	
11. Outer bearing cone (7).	a. Use wheel bearing packing tool to pack with grease, or pack by hand. b. Place on spindle (1) against outer bearing cup (6). Small end of bearing should point towards truck.	

WHEELS AND TIRES.

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920 (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237240

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

C. PACKING AND INSTALLATION OF BEARINGS (Continued).

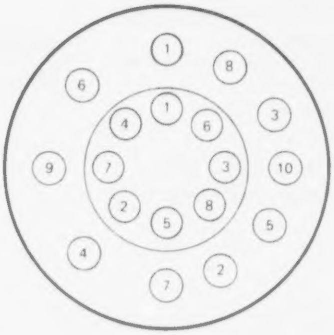
LOCATION/ITEM	ACTION	REMARKS
12. Preload nut (8).	a. Install the preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N.m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N.m). While rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N.m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	
13. Retainer (9) and locknut (10).	a. Screw onto spindle (1). b. Tighten locknut (10) to 250 to 400 lb-ft, (340 - 544 N.m).	

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
14. Drive flange (11).	a. Coat inside surface with silicone (RTV) gasket material. b. Attach to hub with eight capscrews (13) and washers (12). c. Install expansion plug (14), if removed.	
15. Eight capscrews (13) and washers (12).	Tighten to 175-205 lb-ft (237-282 N·m) with torque wrench. Tighten as shown.	
16. Tire and wheel assembly	Install (refer to TM 9-2320-273-10). Tighten wheel stud nuts (15) with torque wrench to 450 lb-ft (610 N·m), in sequence shown.	

10-14. FRONT WHEEL BEARINGS AND SEALS MAINTENANCE (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS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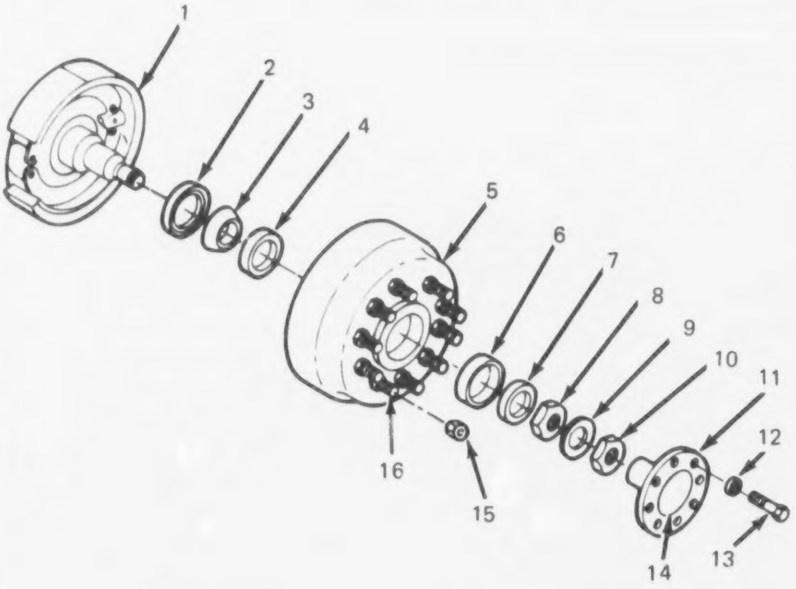
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LEGEND:

1. SPINDLE
2. OIL SEAL
3. INNER BEARING CONE
4. INNER BEARING CUP
5. HUB AND DRUM ASSEMBLY
6. OUTER BEARING CUP
7. OUTER BEARING CONE
8. PRELOAD NUT
9. RETAINER
10. LOCK NUT
11. DRIVE FLANGE
12. WASHER (8)
13. CAPSCREW (8)
14. EXPANSION PLUG
15. WHEEL STUD NUT (10)
16. WHEEL STUD (10)

TA 237241

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(25)
b. Inspection of Bearings.	(5)
c. Packing and Installation of Bearings.	(30)
	60 Minutes Total

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Wheel Bearing Nut Wrench, PN 1914 (45152)
Part of Wrench Set, NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
Inner Bearing Seal M915 (A1205-T-696) M916 Thru M920 (A1205-T-774) (78500).
Outer Bearing Seal M915 (A1205-N-612) M916 Thru M920 (A1205-4-619) (78500).
Star Washers (16) (1229-X-518) (78500).
Gasket (2) M915 (2208-X-440) M916 Thru M920 (2208-W-413) (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-3.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

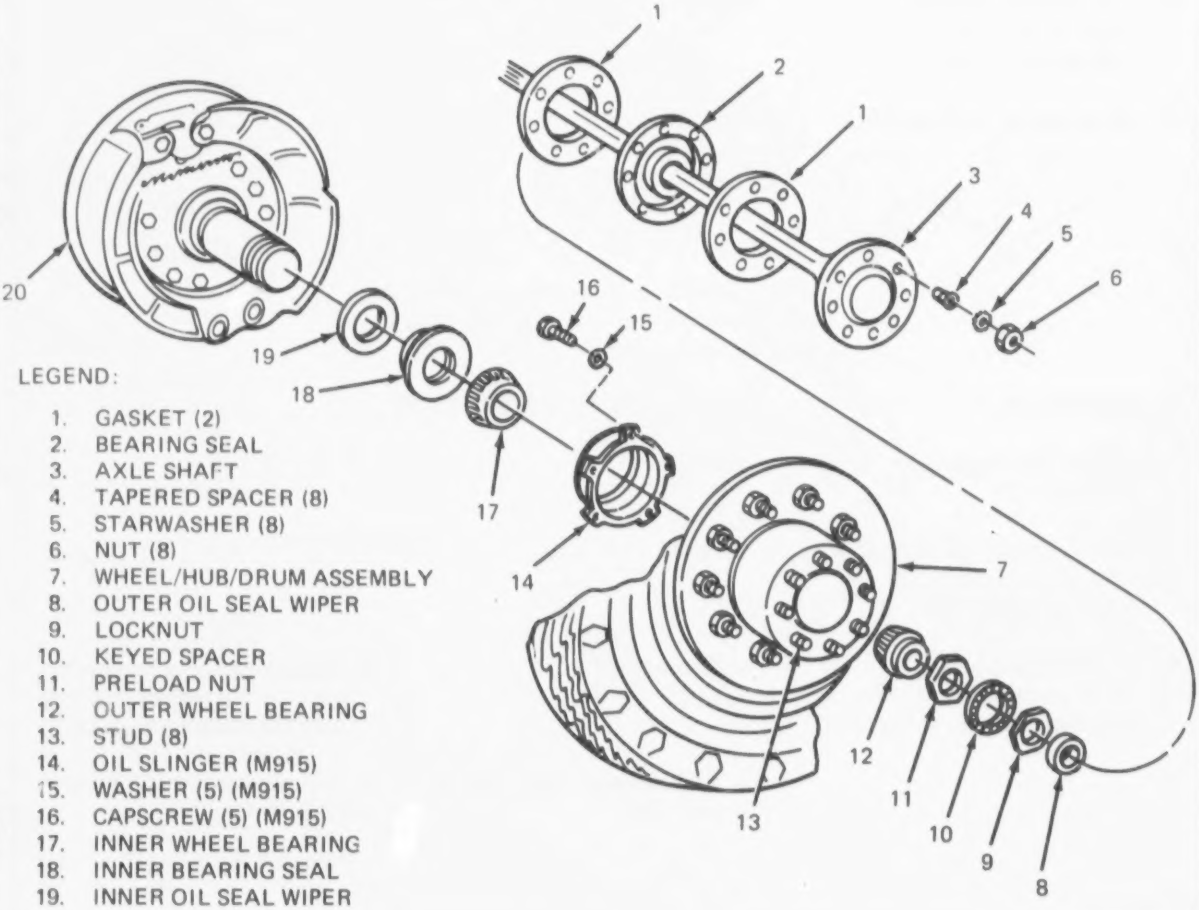
Engine OFF.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Eight nuts (6) and star washers (5).	a. Remove. b. Throw away star washers (5).	

CAUTION

Do not pry between flange of axle shaft (3) and mating surface of hub. Do not hit studs (13).



LEGEND:

1. GASKET (2)
2. BEARING SEAL
3. AXLE SHAFT
4. TAPERED SPACER (8)
5. STARWASHER (8)
6. NUT (8)
7. WHEEL/HUB/DRUM ASSEMBLY
8. OUTER OIL SEAL WIPER
9. LOCKNUT
10. KEYED SPACER
11. PRELOAD NUT
12. OUTER WHEEL BEARING
13. STUD (8)
14. OIL SLINGER (M915)
15. WASHER (5) (M915)
16. CAPSCREW (5) (M915)
17. INNER WHEEL BEARING
18. INNER BEARING SEAL
19. INNER OIL SEAL WIPER
20. BRAKE

TA 237242

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Axle shaft (3) and eight tapered spacers (4).	a. Use slidge hammer to pound until tapered spacers (4) loosen.	Do not hit studs (13).
	b. Remove.	
3. Two gaskets (1), bearing seal (2), and outer oil seal wiper (8).	a. Remove.	Replace outer oil seal wiper (8), if damaged.
	b. Throw away bearing seal (2) and two gaskets (1).	
4. Locknut (9), keyed spacer (10), and preload nut (11).	Remove with wheel nut wrench.	
5. Outer wheel bearing (12).	Pull out.	

WARNING

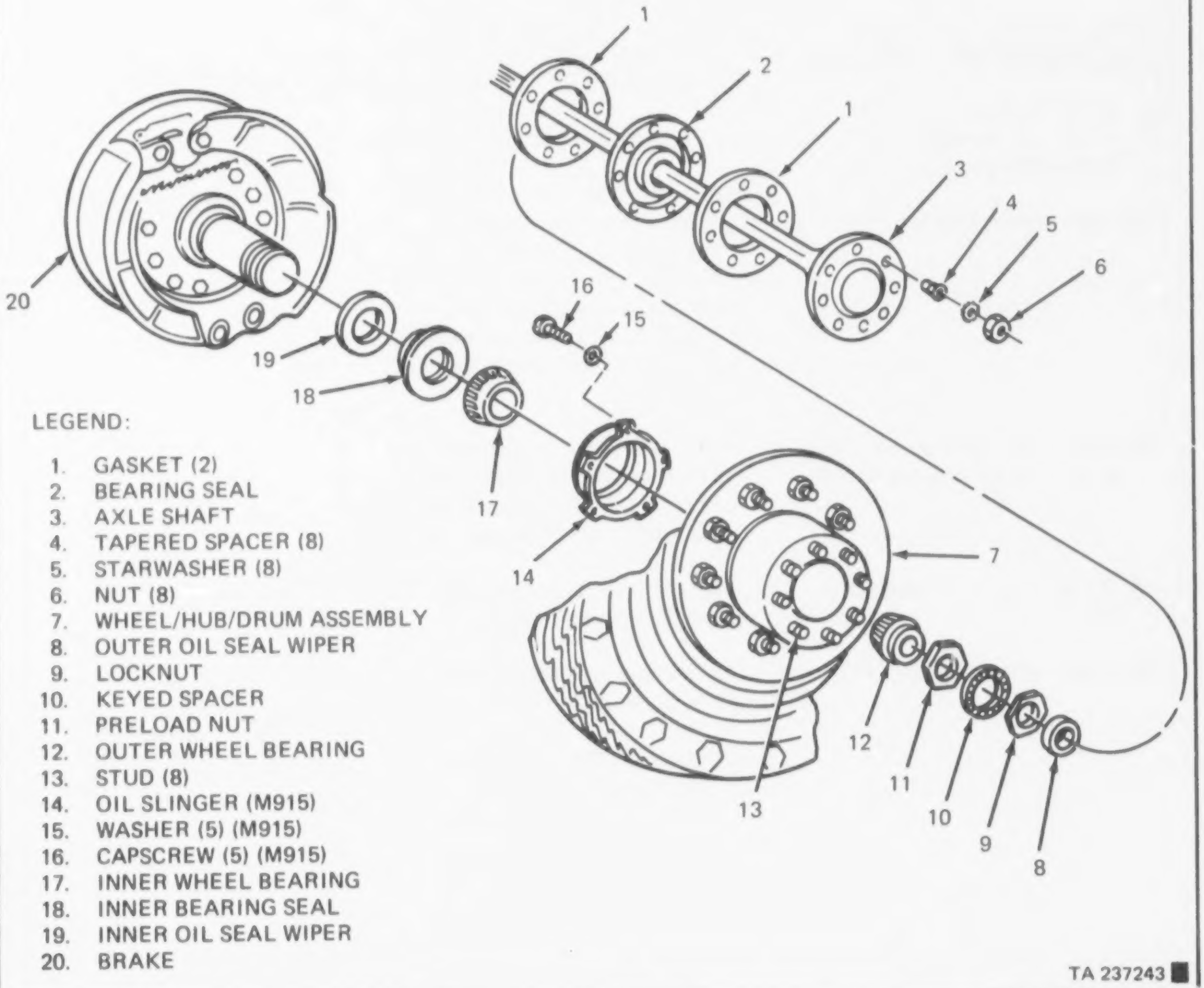
Do not depend on jacks to support truck. Block it securely so that it will not fall if jack gives way.

LOCATION/ITEM	ACTION	REMARKS
6. Rear wheels	Jack up (see TM 9-2320-273-10).	
7. Wheel, hub, and drum assembly (7).	Remove.	
8. (M915 Only) Oil Slinger (14), five washers (15) and capscrews (16).	Remove.	
9. Inner bearing seal (18), inner wheel bearing (17), and inner oil seal wiper (19).	a. Remove.	a. You should now be reaching into the side of the hub that was facing the truck.
	b. Throw away inner bearing seal (18).	b. Replace inner oil seal wiper (18), if damaged.

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF BEARINGS.		
10. Outer wheel bearing (12) and inner wheel bearing (17).	a. Inspect for: 1. Missing rollers. 2. Flat, chipped, or pitted surfaces. 3. Discoloration. 4. Secure fit.	Replace, if necessary.



LEGEND:

1. GASKET (2)
2. BEARING SEAL
3. AXLE SHAFT
4. TAPERED SPACER (8)
5. STARWASHER (8)
6. NUT (8)
7. WHEEL/HUB/DRUM ASSEMBLY
8. OUTER OIL SEAL WIPER
9. LOCKNUT
10. KEYED SPACER
11. PRELOAD NUT
12. OUTER WHEEL BEARING
13. STUD (8)
14. OIL SLINGER (M915)
15. WASHER (5) (M915)
16. CAPSCREW (5) (M915)
17. INNER WHEEL BEARING
18. INNER BEARING SEAL
19. INNER OIL SEAL WIPER
20. BRAKE

TA 237243

WHEELS AND TIRES.

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF BEARINGS (Continued).		
10. Outer wheel bearing (12) and inner wheel bearing (17) (continued).	b. If bearings are to be reused: 1. Remove surface oil and gum deposits. 2. Clean with solvent. 3. Wipe dry. Do not use compressed air. 4. Coat with a light film of oil. Wrap bearings in paper until you are ready to install them.	See TM 9-214 for information on maintenance.
C. PACKING AND INSTALLATION OF BEARINGS.		
11. (M915 only) Oil slinger (14), five washers (15) and capscrews (16).	Install.	
12. Inner wheel bearing (17).	a. Use bearing packing tool to pack with grease. b. Place in wheel/hub/drum assembly (7) so that smaller end will point away from truck.	
13. New inner bearing seal (18) and inner oil seal wiper (19).	Place over inner wheel bearing (17) in wheel/hub/drum assembly (7). Lettering should face truck when wheel is mounted.	
14. Wheel/hub/drum assembly (7).	Place in position over brake (20), using wheel dolly.	
15. Outer wheel bearing (12).	a. Use bearing packing tool to pack with grease. b. Place on hub with small end towards truck.	

10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
16. Preload nut (11).	a. Install preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N.m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N.m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft. d. Back off preload nut no more than 1/4 turn counterclockwise.	
17. Keyed spacer (10) and locknut (9).	a. Install with wheel bearing nut wrench. b. Torque locknut (9) to 250 - 400 lb-ft (340 - 544 N.m).	

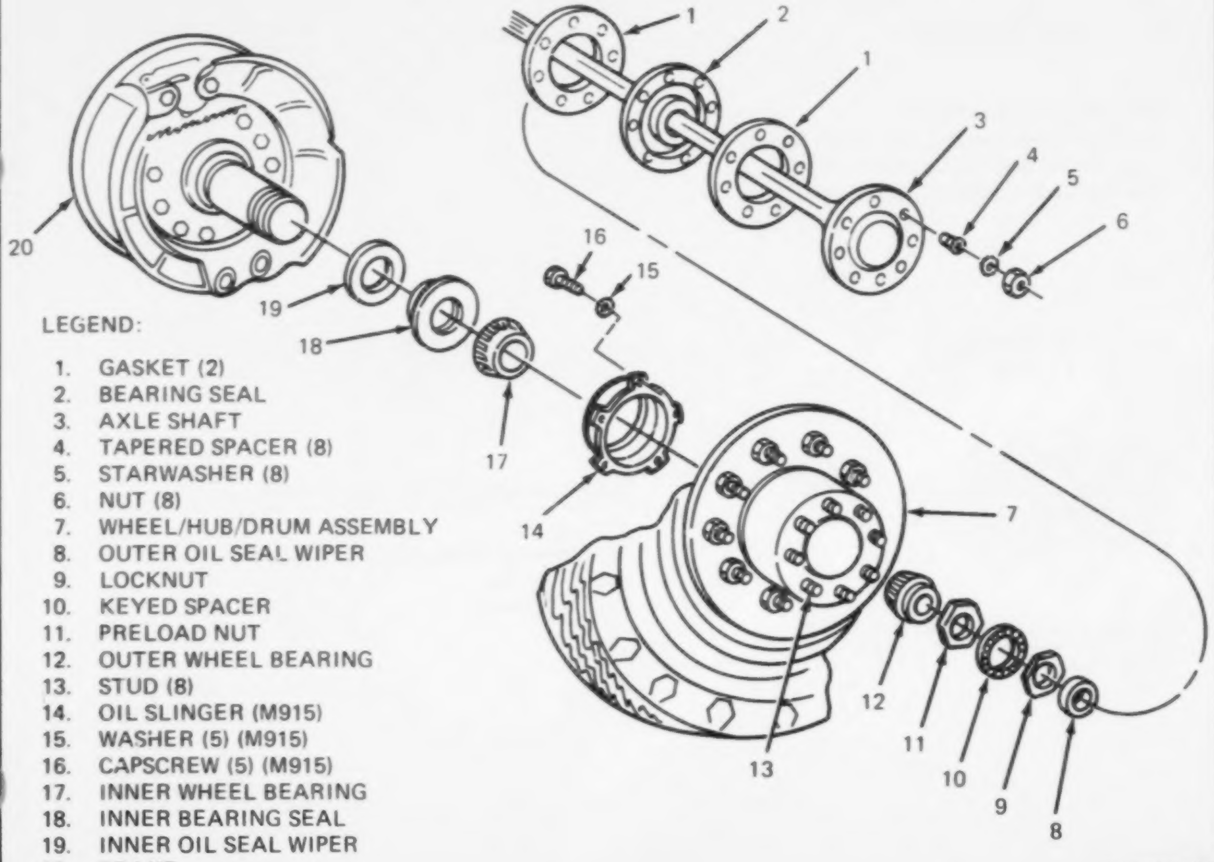
10-15. REAR WHEEL BEARINGS, SHAFTS, AND SEALS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued)		
18. New bearing seal (2), two new flange gaskets (1), and outer oil seal wiper (8).	Put in place over studs (13).	
19. Axle shaft (3).	Set in place.	
20. Eight tapered spacers (4), star washers (5), and nuts (6).	Screw on. Tighten to 175 lb-ft (237 N·m) with torque wrench. Tighten in this order:	

NOTE

Follow-on maintenance action required:

After road testing vehicle, check for oil leaks.



LEGEND:

1. GASKET (2)
2. BEARING SEAL
3. AXLE SHAFT
4. TAPERED SPACER (8)
5. STARWASHER (8)
6. NUT (8)
7. WHEEL/HUB/DRUM ASSEMBLY
8. OUTER OIL SEAL WIPER
9. LOCKNUT
10. KEYED SPACER
11. PRELOAD NUT
12. OUTER WHEEL BEARING
13. STUD (8)
14. OIL SLINGER (M915)
15. WASHER (5) (M915)
16. CAPSCREW (5) (M915)
17. INNER WHEEL BEARING
18. INNER BEARING SEAL
19. INNER OIL SEAL WIPER
20. BRAKE

TA 237244

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10-16. PUSHER AXLE BEARINGS AND SEALS.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(30)
b. Inspection.	(10)
c. Packing and Installation of Bearings.	(30)
	70 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

Outside Wheel Bearing Nut Wrench, PN 1909, Part of Set NSN 5120-00-169-4586.
Inside Wheel Bearing Nut Wrench, PN 1927, Part of Set NSN 5120-00-169-4586.

MATERIALS/PARTS (P/N)

Seal Installer.
Brass Drift.
GAA (Refer to Appendix C).
Non-Flammable Cleaning Solvent SD-2 (Refer to Appendix C).
Inner Bearing Seal, 1205-P-1212 (78500).
Hub Cap Gasket, 2208-P-796 (78500).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-3.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

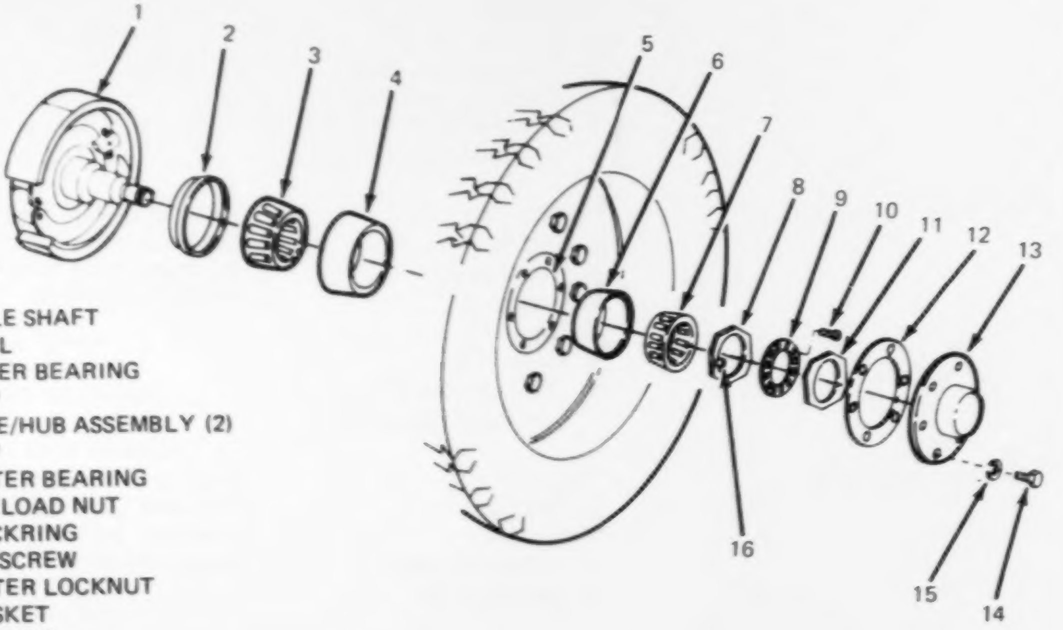
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Wheels Blocked.

10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Axle.	Jack up.	
2. Tire/hub assembly (5).	Place on wheel dolly.	
3. Six capscrews (14) and washers (15).	Remove.	
4. Hub cap (13) and gasket (12).	Remove.	Discard gasket.
5. Allen head setscrew (10).	Remove.	
6. Outer locknut (11).	Remove.	
7. Lockring (9).	Remove.	
8. Preload nut (8).	Remove.	



LEGEND:

1. AXLE SHAFT
2. SEAL
3. INNER BEARING
4. CUP
5. TIRE/HUB ASSEMBLY (2)
6. CUP
7. OUTER BEARING
8. PRELOAD NUT
9. LOCKRING
10. SETSCREW
11. OUTER LOCKNUT
12. GASKET
13. HUB CAP
14. CAPSCREW (6)
15. WASHER (6)
16. ALINING PIN

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10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

A. REMOVAL (Continued).

LOCATION/ITEM	ACTION	REMARKS
9. Outer bearing (7).	Remove.	
10. Tire/hub assembly (5).	Slide off axle shaft (1).	
11. Inner bearing (3) and seal (2).	Remove.	Use hammer and brass drift. Tap out bearing and seal. Discard seal (2).

NOTE

Clean all parts with cleaning solvent SD-2.

WARNING

Do not use compressed air to clean bearings.

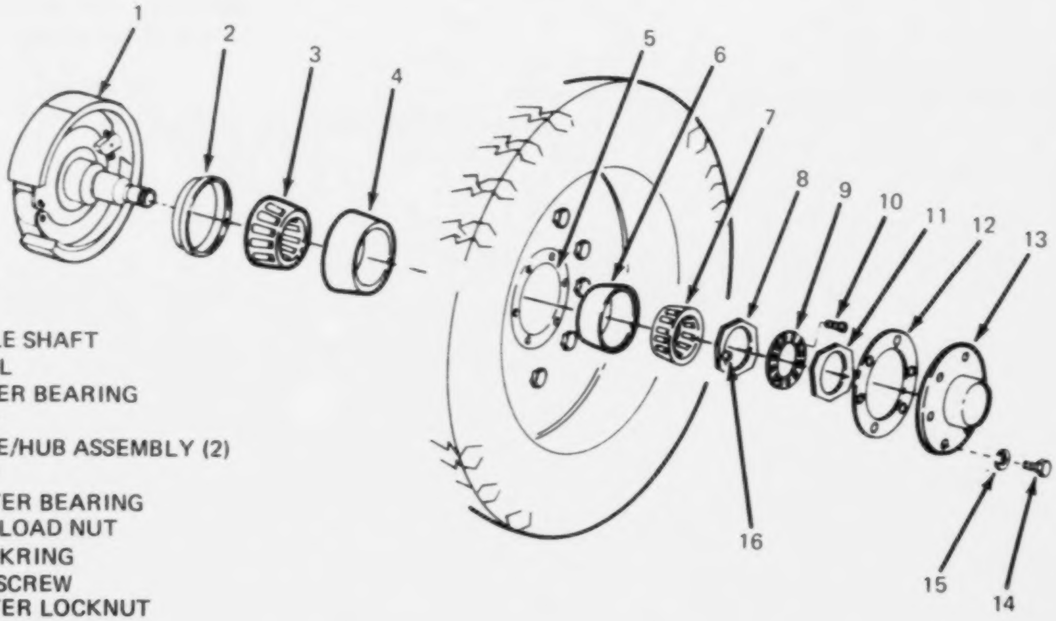
B. INSPECTION.

LOCATION/ITEM	ACTION	REMARKS
12. Inner bearing (3) and outer bearing (7).	Inspect for: a. Cracks. b. Chips. c. Breaks. d. Flat spots on rollers. e. Smooth operation. f. Discoloration (straw colored or bluish tint).	Replace as necessary. Refer to TM 9-2320-273-20P.
13. Cups (4) and (6).	Inspect for: a. Flat Spots. b. Roughness. c. Cracks. d. Gouges. e. Wear. f. Discoloration (straw colored or bluish tint).	Refer to Direct Support Maintenance. If replacement is needed, cups must be pressed out and in.
14. Axle Shaft (1).	Inspect for: a. Grooves. b. Gouges. c. Abnormal wear. d. Discoloration.	Refer to Direct Support Maintenance. If replacement is needed, cups must be pressed out and in.

WHEELS AND TIRES.

10–16. PUSHER AXLE BEARING AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS.		
15. Inner bearings (3).	a. Use bearing packing tool to pack with grease or pack by hand. b. Place in cup (4) inside of hub (5).	
16. New seal (2).	Tap in place.	Use hammer and seal installer.
17. Tire/hub assembly (5).	Slide over axle shaft (1), using wheel dolly.	
18. Outer bearing (7).	a. Use bearing packing tool to pack with grease or pack by hand. b. Insert in cup (6) inside of hub (5).	



LEGEND:

1. AXLE SHAFT
2. SEAL
3. INNER BEARING
4. CUP
5. TIRE/HUB ASSEMBLY (2)
6. CUP
7. OUTER BEARING
8. PRELOAD NUT
9. LOCKRING
10. SETSCREW
11. OUTER LOCKNUT
12. GASKET
13. HUB CAP
14. CAPSCREW (6)
15. WASHER (6)
16. ALINING PIN

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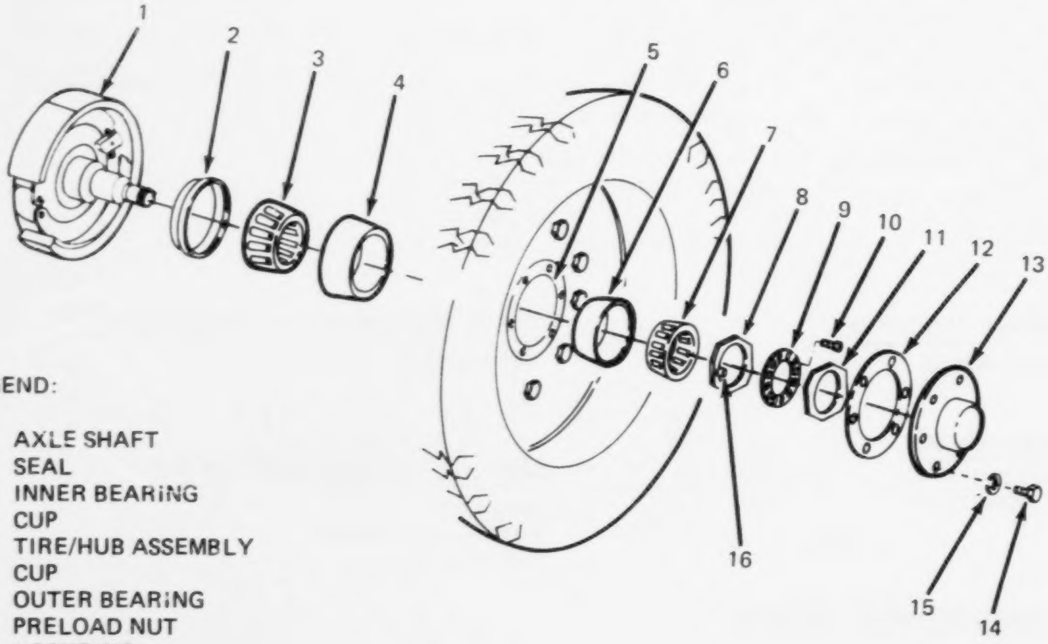
10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
19. Preload nut (8).	a. Install preload nut using wheel bearing nut wrench. b. If reusing the same bearings, torque to 50 lb-ft (68 N.m) while rotating wheel in both directions. c. If new bearings have been installed, torque to 100 lb-ft (136 N.m) while rotating wheel in both directions, back off to 0 lb-ft. Torque to 50 lb-ft (68 N.m). d. Back off preload nut no more than 1/4 turn counterclockwise to install cotter pin.	Alining pin (16) must face toward lockring (9).
20. Lockring (9).	Install.	Adjust preload nut (8) so that alining pin (16) slips into nearest hole in lockring (9).
21. Outer locknuts (11).	a. Install. b. Torque to 250 - 300 lb-ft (339 - 406.8 N.m).	

10-16. PUSHER AXLE BEARINGS AND SEALS (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. PACKING AND INSTALLATION OF BEARINGS (Continued).		
22. Setscrew (10).	Install in one of four tappings.	
23. Gasket (12) hub cap (13).	Line up hoies.	
24. Capscrews (14) and washers (15).	Tighten to 25–31 lb-ft (33.90–42.04 N·m) in sequence shown.	
25. Jack.	Remove from axle.	



LEGEND:

1. AXLE SHAFT
2. SEAL
3. INNER BEARING
4. CUP
5. TIRE/HUB ASSEMBLY
6. CUP
7. OUTER BEARING
8. PRELOAD NUT
9. LOCKRING
10. SETSCREW
11. OUTER LOCKNUT
12. GASKET
13. HUB CAP
14. CAPSCREW (6)
15. WASHER (6)
16. ALINING PIN

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STEERING MECHANISM.

10-17. STEERING WHEEL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(7)
b. Installation.	(7)
c. Operational Check.	(1)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Wheel Puller.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-67A.	Horn Button Assembly Removed.
5-37A.	Batteries Disconnected.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 10-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

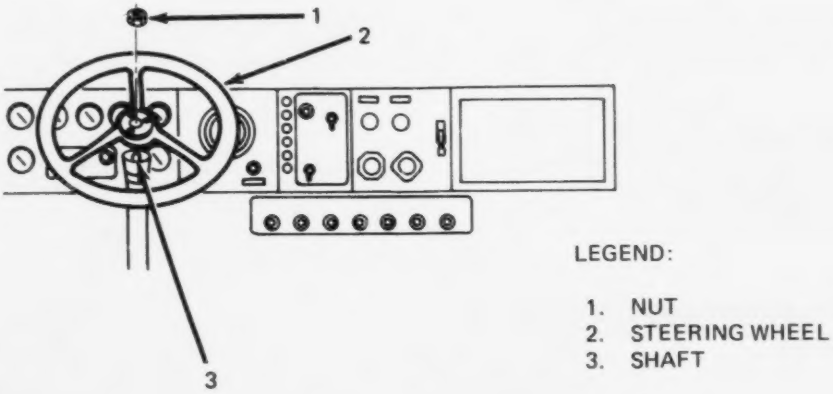
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

STEERING MECHANISM.

10-17. STEERING WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Nut (1).	Unscrew and remove.	
2. Steering wheel (2).	Remove using suitable wheel puller.	
B. INSTALLATION.		
3. Steering wheel (2).	Place on steering column. Turn gently to seat splines.	
4. Nut (1).	Screw onto shaft (3) and tighten.	
C. OPERATIONAL CHECK.		
5. Engine.	Start up (see TM 9-2320-273-10).	
6. Steering wheel (2).	Turn both directions. Check that front wheels turn. Follow on Maintenance. a. Install horn button assembly (para 5-67B). b. Connect batteries (para 5-37B).	



TA 074993

STEERING MECHANISM.

10-18. LOWER STEERING SHAFT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal ·	(10)
b. Disassembly.	(18)
c. Assembly.	(18)
d. Installation.	(30)
e. Operational Check.	(2)
	78 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Non-Flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10 .
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

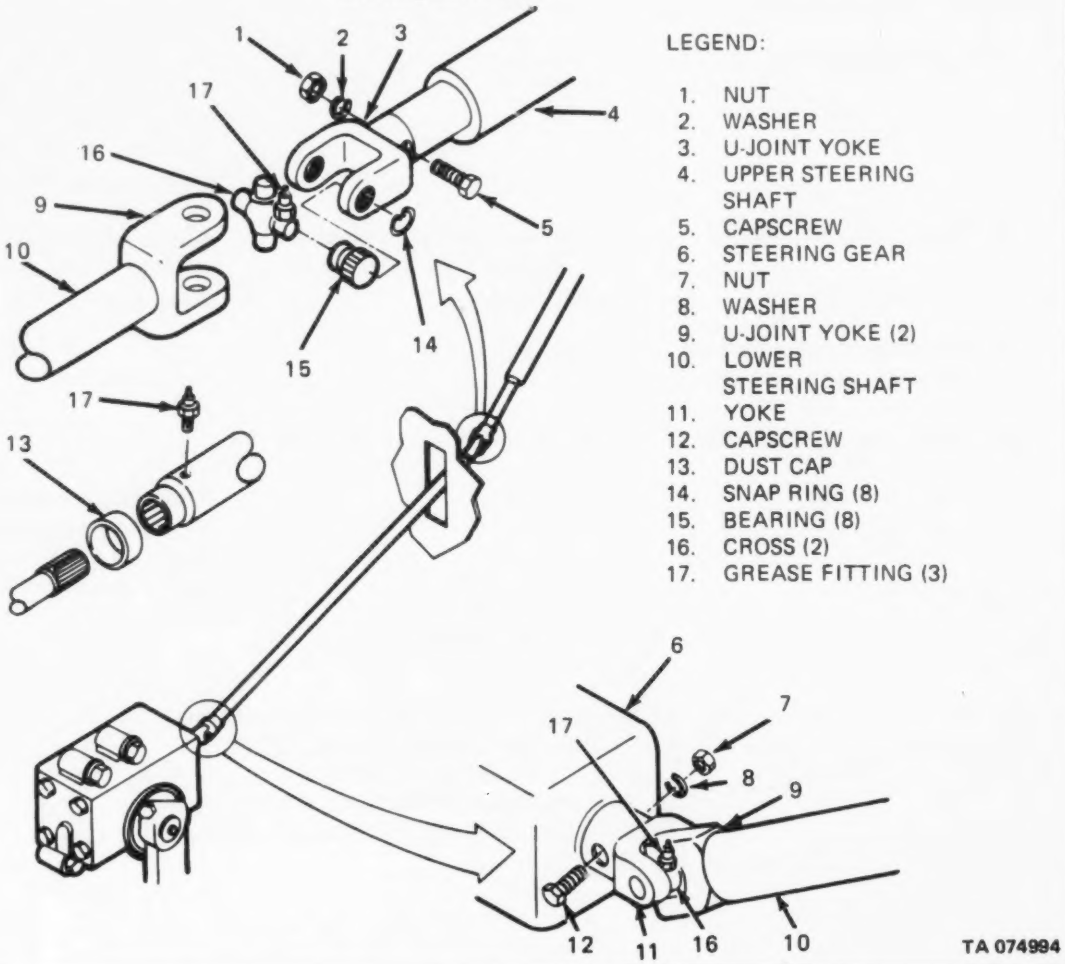
LOCATION/ITEM	ACTION	REMARKS

NOTE

Turn wheels to left for better access.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Nut (1), washer (8), and capscrew (12).	Unscrew and remove.	
2. Yoke (11).	Remove from steering gear (6).	
3. Nut (7), washer (2), and capscrew (5).	Unscrew and remove.	
4. Universal joint yoke (3).	Slide off of upper steering shaft (4).	



LEGEND:

1. NUT
2. WASHER
3. U-JOINT YOKE
4. UPPER STEERING SHAFT
5. CAPSCREW
6. STEERING GEAR
7. NUT
8. WASHER
9. U-JOINT YOKE (2)
10. LOWER STEERING SHAFT
11. YOKE
12. CAPSCREW
13. DUST CAP
14. SNAP RING (8)
15. BEARING (8)
16. CROSS (2)
17. GREASE FITTING (3)

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

A. REMOVAL (Continued).

LOCATION/ITEM	ACTION	REMARKS
5. Lower steering shaft (10).	Remove through firewall from under hood.	U-Joints and yokes will still be attached.

B. DISASSEMBLY.

CAUTION

Tap bearings only hard enough to break them away from snap rings.

LOCATION/ITEM	ACTION	REMARKS
6. Four snap rings (14).	Remove.	
7. Four bearings (15).	Remove.	You can push out the first bearing of each yoke by pressing gently on the opposite bearings. Press cross end to push out second bearing.
8. Three grease fittings (17).	Remove from two crosses (16) and lower steering shaft (10).	Check for thread or ball tip damage and replace as necessary.
9. Two crosses (16) and four yokes (9), (11), and (3).	Separate.	
10. Lower steering shaft (10).	Slide splined sections apart.	
11. Dust cap (13).	Inspect.	If damage is evident, remove by prying up tabs and install new dust cap by staking tabs with a center punch.

WARNING

COMPRESSED AIR USED FOR CLEANING PURPOSES WILL NOT EXCEED 30 PSI. USE ONLY WITH EFFECTIVE CHIP GUARDING AND PERSONAL PROTECTIVE EQUIPMENT (GOGGLES/SHIELD, GLOVES, ETC).

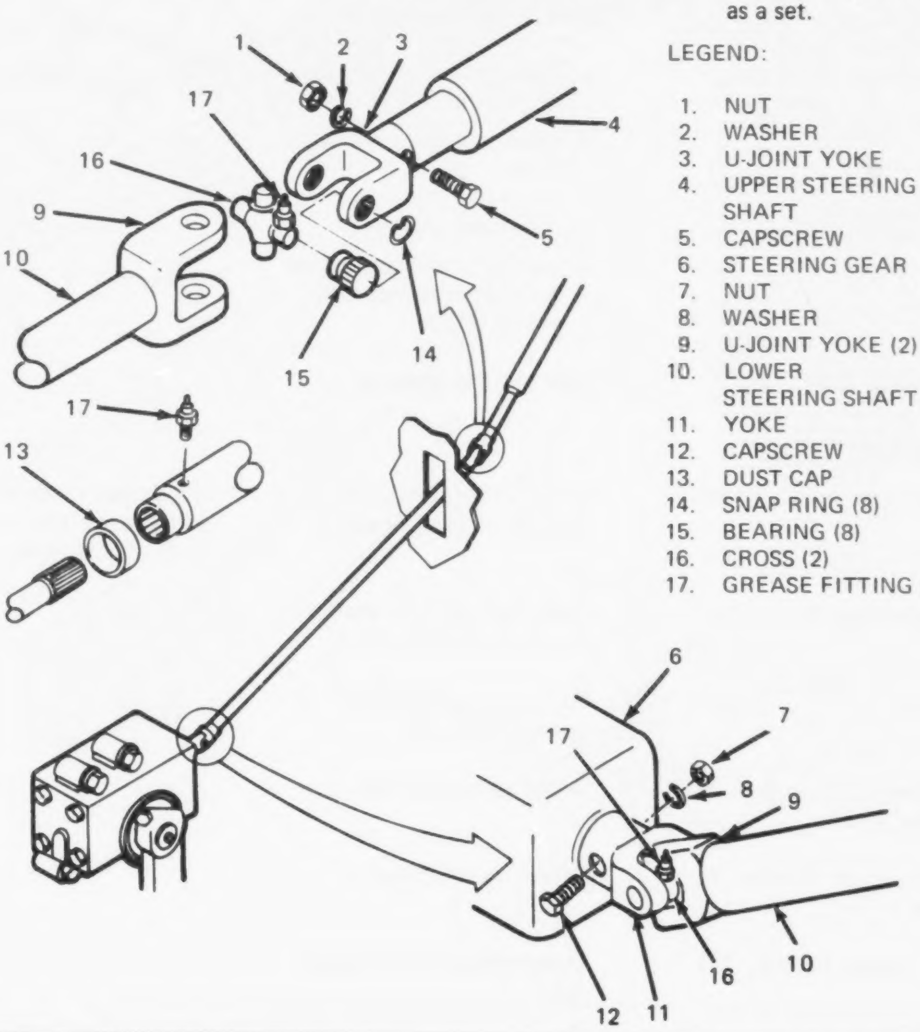
10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

B. DISASSEMBLY (Continued).

CAUTION

Do not allow SD-2 dry cleaning solvents to come in contact with seals or flexible hoses. These cleaners may damage leather, rubber, and synthetic materials.

LOCATION/ITEM	ACTION	REMARKS
12. Four yokes (3), (9), (11), two crosses (16), and eight bearings (15).	a. Clean with SD-2 dry cleaning solvent and dry with compressed air.	
	b. Inspect for cracks, wear, nicks, burrs, and scratches.	Use Fine stone to remove light marks. Replace as necessary as a set.



LEGEND:

1. NUT
2. WASHER
3. U-JOINT YOKE
4. UPPER STEERING SHAFT
5. CAPSCREW
6. STEERING GEAR
7. NUT
8. WASHER
9. U-JOINT YOKE (2)
10. LOWER STEERING SHAFT
11. YOKE
12. CAPSCREW
13. DUST CAP
14. SNAP RING (8)
15. BEARING (8)
16. CROSS (2)
17. GREASE FITTING (3)

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10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

NOTE

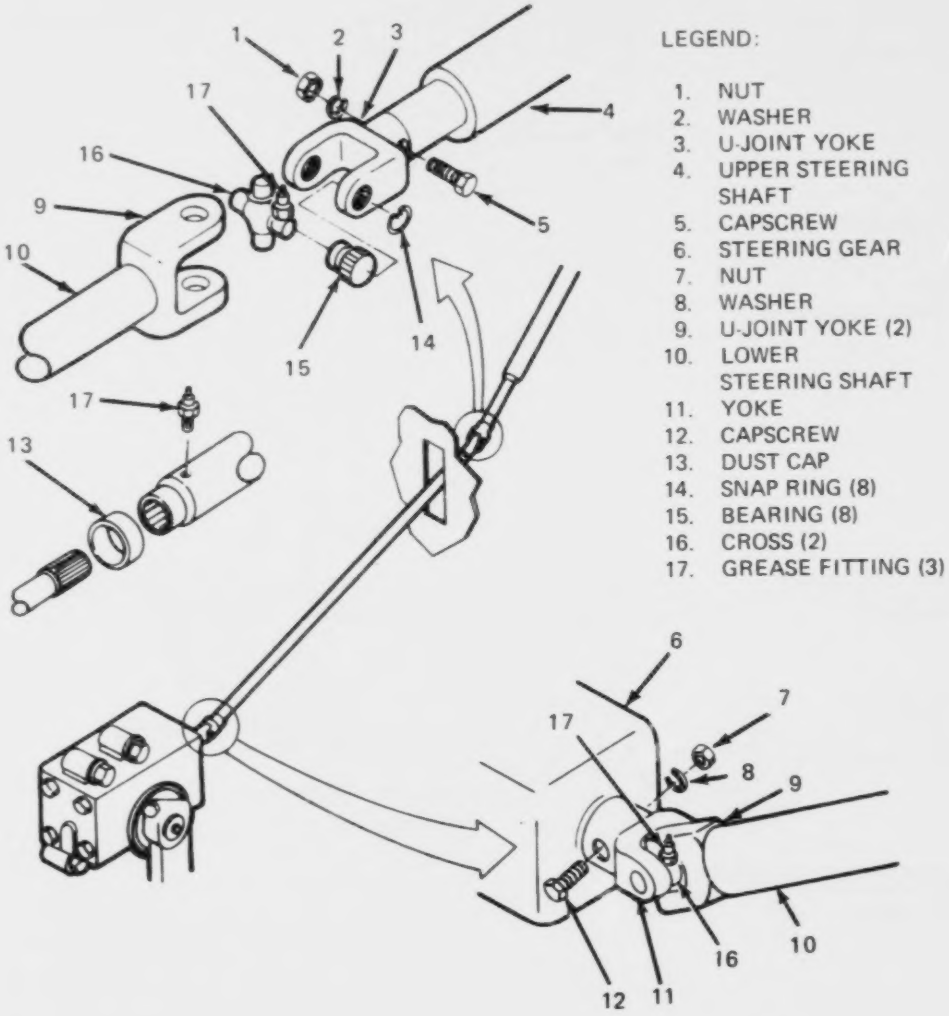
Bearings and cross should be replaced as a set. If the cross or any bearing is damaged, replace the set.

LOCATION/ITEM	ACTION	REMARKS
C. ASSEMBLY.		
13. Lower steering shaft (10).	Slide splined sections together at dust cap (13).	
14. Three grease fittings (17).	Install in two crosses (16) and lower steering shaft (10).	
15. Two crosses (16).	a. Place between four yokes (3), (9), and (11). b. Lubricate assembly with GAA.	
16. Eight bearings (15).	a. Lubricate with GAA. b. Use soft hammer to carefully tap bearings into yokes.	
17. Eight snap rings (14).	Seat in yoke grooves.	
D. INSTALLATION.		
18. Lower steering shaft (10).	From under hood, insert through hole in firewall.	Upper and lower U-joints and yokes are attached to shaft at this time.
19. U-joint yoke (3).	Push onto splined shaft of upper steering shaft (4).	
20. Yoke (11).	Push onto splined shaft of steering gear (6).	
21. Capscrew (12), washer (8), and nut (7).	Screw in and tighten.	
22. Capscrew (5), washer (2), and nut (1).	Screw on and tighten.	
23. Three grease fittings (17).	Use grease gun and apply GAA.	

STEERING MECHANISM.

10-18. LOWER STEERING SHAFT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. OPERATIONAL CHECK.		
24. Engine.	Start up (see TM 9-2320-273-10).	
25. Steering wheel.	Turn. Check that front wheels turn freely.	



LEGEND:

1. NUT
2. WASHER
3. U-JOINT YOKE
4. UPPER STEERING SHAFT
5. CAPSCREW
6. STEERING GEAR
7. NUT
8. WASHER
9. U-JOINT YOKE (2)
10. LOWER STEERING SHAFT
11. YOKE
12. CAPSCREW
13. DUST CAP
14. SNAP RING (8)
15. BEARING (8)
16. CROSS (2)
17. GREASE FITTING (3)

TA 074996

STEERING MECHANISM.

10-19. DRAG LINK MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Inspection of Mating Connections.	(5)
c. Installation.	(20)
d. Operational Check.	(15)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin (2), K-2616 (78500).
Grease Gun
GAA (refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 10-2.

SPECIAL ENVIRONMENTAL CONDITIONS

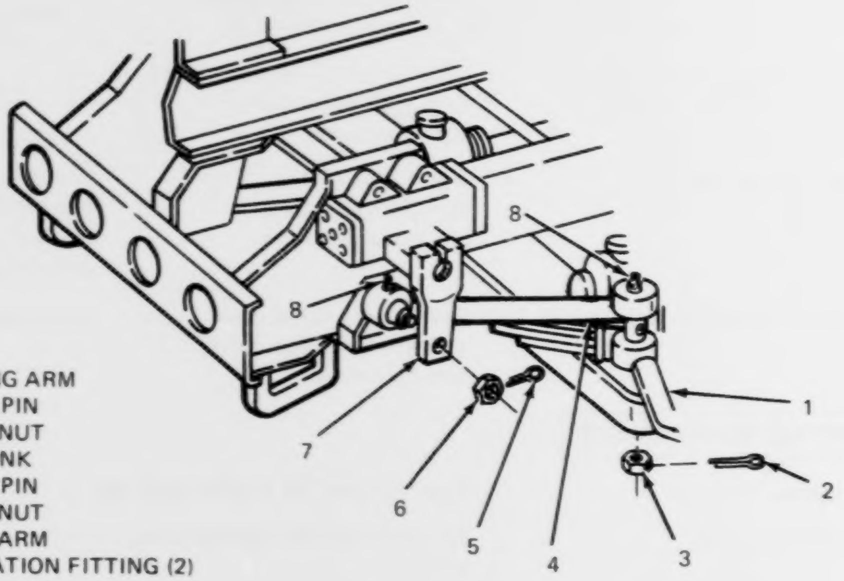
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-19. DRAG LINK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
	NOTE Turn wheel left or right for easy accessability in performing task.	
A. REMOVAL.		
1. Cotter pins (2) and (5).	Remove with pliers and throw away.	If pins stick, tighten or loosen castle nuts (3) and (6) slightly to aline slot.
2. Castle nuts (3) and (6).	a. Back off nuts until they are flush with threaded portion of shaft. b. Using a sledge hammer hit this area until drag link unseats. c. Unscrew and remove.	



LEGEND:

1. STEERING ARM
2. COTTER PIN
3. CASTLE NUT
4. DRAG LINK
5. COTTER PIN
6. CASTLE NUT
7. PITMAN ARM
8. LUBRICATION FITTING (2)

TA 074997

STEERING MECHANISM.

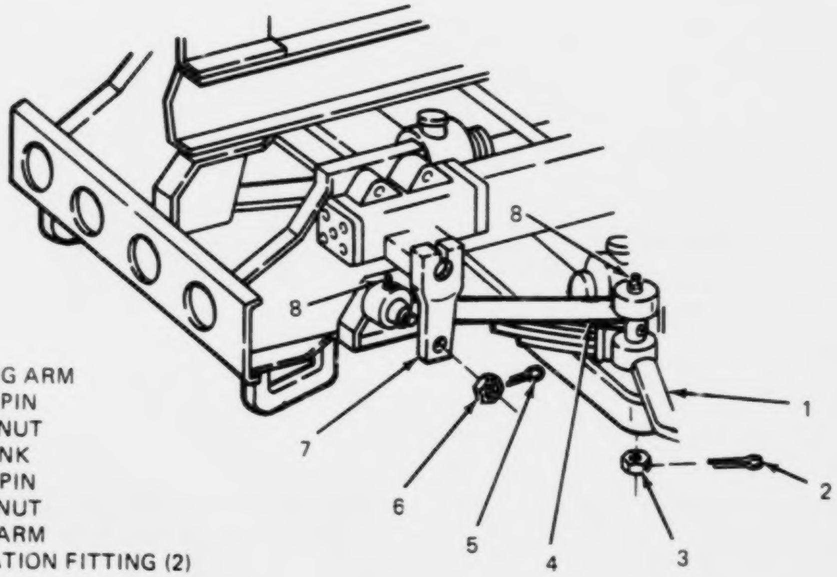
10-19. DRAG LINK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Drag link (4).	Remove.	
4. Two lubrication fittings (8).	Unscrew and remove.	
B. INSPECTION OF MATING CONNECTIONS.		
5. Drag link (4), steering arm (1), and pitman arm (7).	Inspect mating surfaces for: a. Scoring. b. Gouging. c. Excess or uneven wear.	Replace if necessary. If connections are damaged, troubleshoot steering system (para 10-5).
6. Two lubrication fittings (8).	Inspect for: a. Damaged ball end seal. b. Damaged threads.	Replace as necessary.
C. INSTALLATION.		
7. Two lubrication fittings (8).	Install at either end of drag link.	
8. Drag link (4).	a. Place one end in steering arm (1). b. Place the other end in pitman arm (7).	
9. Castle nuts (3) and (6).	Screw on and tighten to 120 lb-ft (163 N·m) with torque wrench.	
10. New cotter pins (2) and (5).	Insert cotter pins (2) and (5) with pliers and bend ends over.	It may be necessary to tighten castle nuts (3) and (6) further in order to aline slots with hole.
11. Two lubrication fittings (8).	Grease with GAA until grease is visible at either end connection.	Use grease gun.
D. OPERATIONAL CHECK.		
12. Engine.	Start up (see TM 9-2320-273-10).	
13. Steering wheel.	Check to see that wheels turn freely.	
14. Engine.	Shut down (see TM 9-2320-273-10).	

STEERING MECHANISM.

10-19. DRAG LINK MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. STEERING ARM
2. COTTER PIN
3. CASTLE NUT
4. DRAG LINK
5. COTTER PIN
6. CASTLE NUT
7. PITMAN ARM
8. LUBRICATION FITTING (2)

TA 074998

STEERING MECHANISM.

10-20. TIE ROD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Inspection of End Assemblies.	(5)
c. Installation.	(25)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Balljoint Puller.
Jack Stands.
Cotter Key (2), K-2616 (78500).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-14A or C.	Front Fenders Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

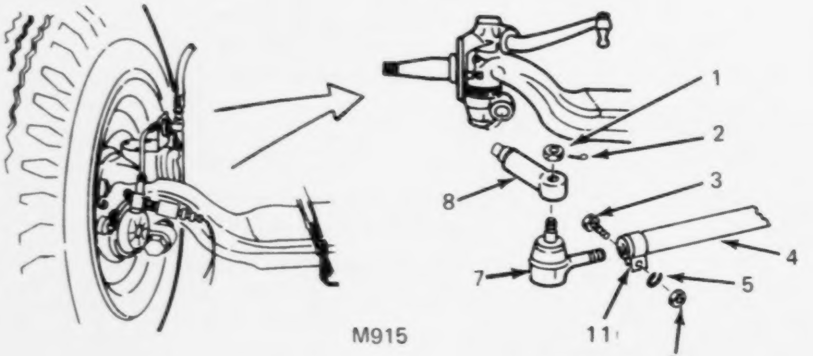
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

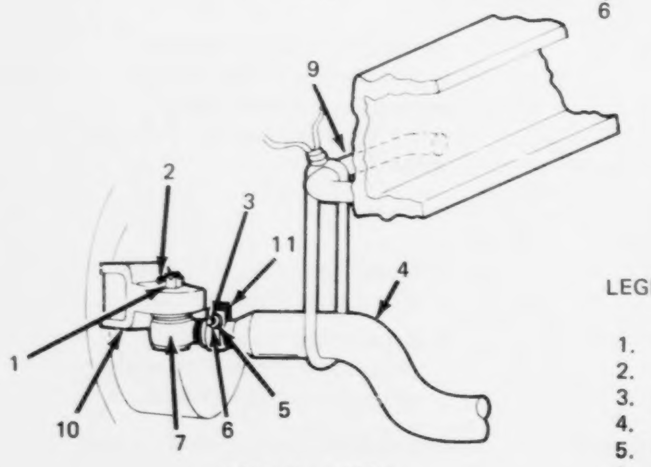
STEERING MECHANISM.

10-20. TIE ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Tie downs (9) and tie rod (4).	Tie a suitable rope between these two points, on either side, to support weight of tie rod ends when disconnected.	



M915



M916 thru M920

LEGEND:

1. NUT (2)
2. COTTER KEY (2)
3. BOLT (2)
4. TIE ROD
5. WASHER (2)
6. NUT (2)
7. BALL JOINT (2)
8. STEERING ARM (2)
9. TIE DOWN (2)
10. KNUCKLE (2)
11. CLAMP (2)

TA 074999

10-20. TIE ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Two cotter keys (2) and nuts (1).	Remove from ball joints (7) on each side.	
3. Two ball joints (7).	a. Using ball joint puller or tapping with mallet remove from steering arms (8) on each side (M915). Remove from knuckles (10) (M916 thru M920). b. Lower and remove tie rod (4) with ball joints (7) by unfastening and lowering rope sling on either side.	
4. Two bolts (3), washers (5), and nuts (6).	Loosen.	
5. Two ball joints (7).	a. Counting the number of turns, unscrew from tie rod (4). b. Slide off clamp (11) from tie rod (4).	
B. INSPECTION OF END ASSEMBLIES.		
6. Two ball joints (7).	Holding tie rod connection in one hand and steering arm connection in other hand, check for any play or looseness.	If there is any looseness, replace assembly.
C. INSTALLATION.		
7. Two ball joints (7).	a. Slide one clamp (11) onto either end of tie rod (4). b. Screw onto tie rod (4), using same number of turns as you counted in step 5.	
8. Two bolts (3), washers (5), and nuts (6).	Install thru two clamps (11) and torque to 40-55 lb-ft (54-74 N·m).	
9. Two ball joints (7).	Fasten ropes to tie downs (9) and tie rods (4) and hoist up into steering arms (8) (M915) or knuckles (10) (M916 thru M920). Tie rope sling securely.	

STEERING MECHANISM.

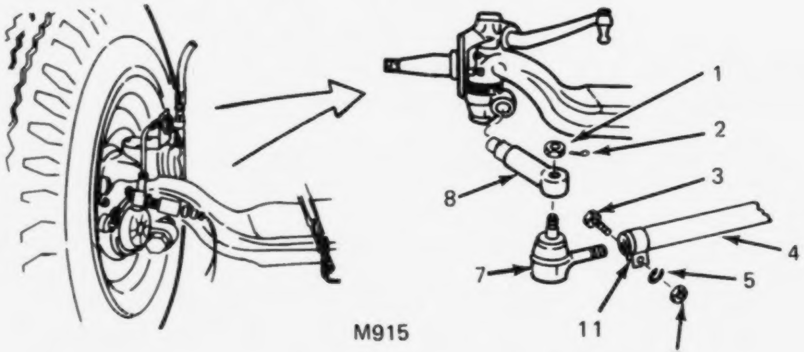
10-20. TIE ROD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
10. Two nuts (1).	a. Torque to 110-125 lb-ft (149-169 N·m). b. Secure with new cotter key (2) at each end.	

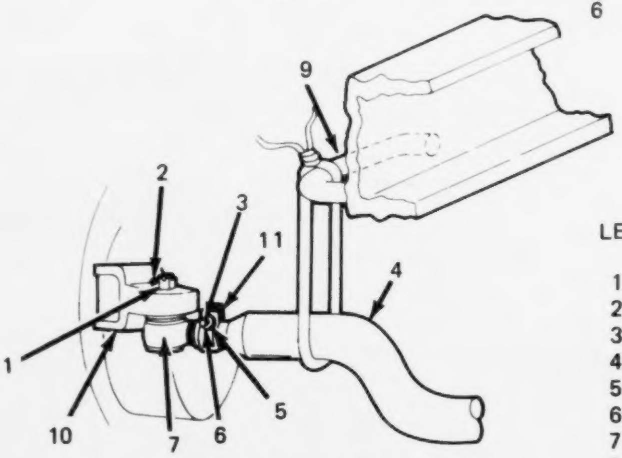
NOTE

Follow-on maintenance action required:

Check wheel alinement; refer to paragraph 10-10A. Install front fenders; refer to paragraph 11-14 B or D.



M915



M916 thru M920

LEGEND:

1. NUT (2)
2. COTTER KEY (2)
3. BOLT (2)
4. TIE ROD
5. WASHER (2)
6. NUT (2)
7. BALL JOINT (2)
8. STEERING ARM (2)
9. TIE DOWN (2)
10. KNUCKLE (2)
11. CLAMP (2)

TA 075000

10-21. PITMAN ARM MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Inspection of Mating Surfaces.	(5)
c. Installation.	(20)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin, K-2616 (78500).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-21. PITMAN ARM MAINTENANCE (Continued).

NOTE

Check for alinement marks (1) and (3) on pitman arm (7) and steering gear shaft (9). If none are found, put scribe lines on at this time.

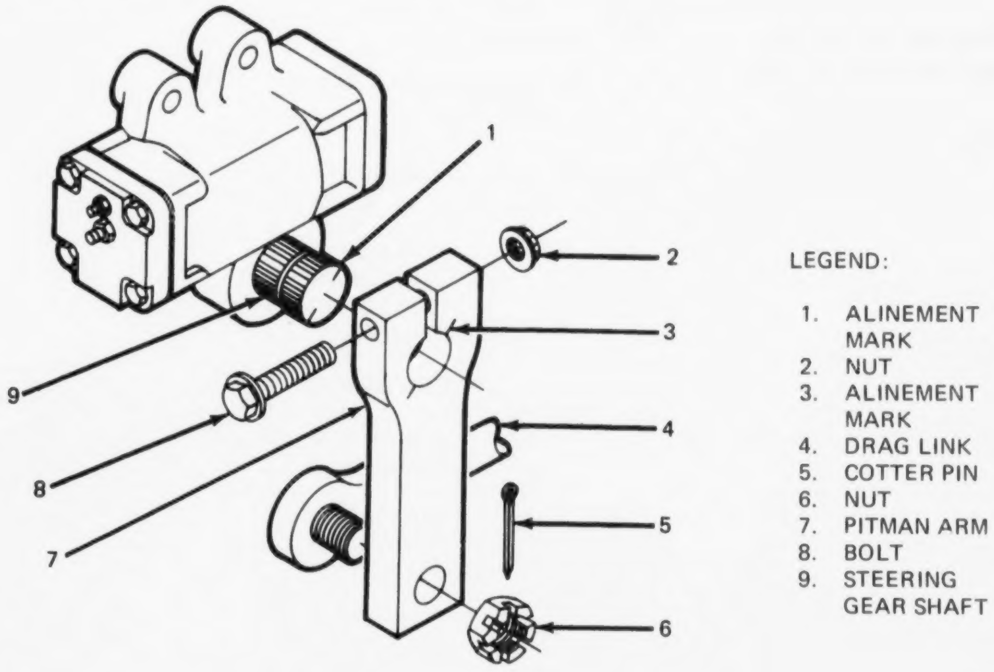
A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Cotter pin (5), nut (6), and drag link (4).	Remove.	Discard cotter pin (5).
2. Nut (2) and bolt (8).	Unscrew and remove.	

CAUTION

Be careful not to damage shaft when removing pitman arm.

LOCATION/ITEM	ACTION	REMARKS
3. Pitman arm (7).	Remove.	



LEGEND:

1. ALINEMENT MARK
2. NUT
3. ALINEMENT MARK
4. DRAG LINK
5. COTTER PIN
6. NUT
7. PITMAN ARM
8. BOLT
9. STEERING GEAR SHAFT

TA 075001

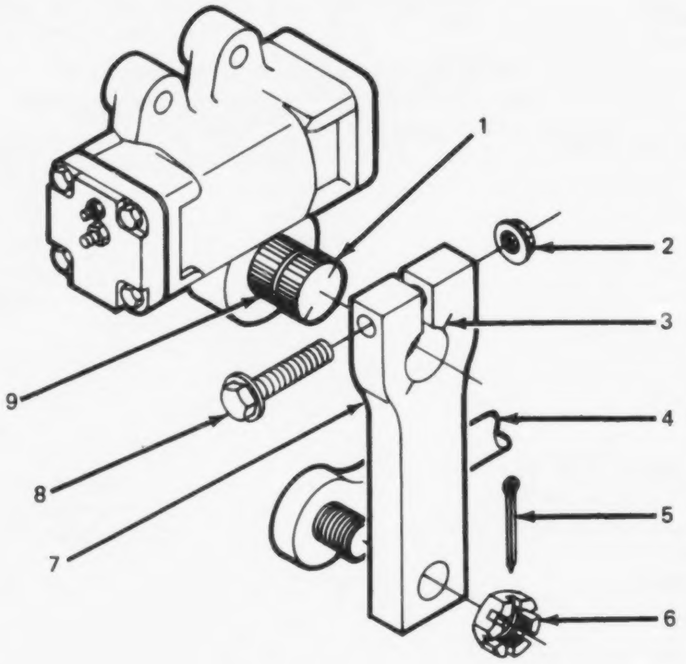
10-21. PITMAN ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF MATING SURFACES.		
4. Pitman arm (7) and steering gear shaft (9).	Inspect mating surfaces for: a. Burrs. b. Gouges. c. Uneven or excess wear.	If pitman arm is damaged, replace. If shaft is damaged, replace steering gear or refer problem to Direct Support Maintenance.
C. INSTALLATION.		
5. Pitman arm (7) and steering gear shaft (9).	a. Aline marks (1) and (3). b. Insert wedge to open arm slightly. c. Drive on with mallet. d. Check that marks are still alined.	
6. Nut (2) and bolt (8).	Screw on. Tighten to 400 lb-ft (542 N·m) with torque wrench.	
7. Drag link (4), nut (6), and new cotter pin (5).	a. Install. b. Torque nut to 120 lb-ft (163 N·m).	

STEERING MECHANISM.

10-21. PITMAN ARM MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. ALINEMENT MARK
2. NUT
3. ALINEMENT MARK
4. DRAG LINK
5. COTTER PIN
6. NUT
7. PITMAN ARM
8. BOLT
9. STEERING GEAR SHAFT

TA 075002

STEERING MECHANISM.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Inspection of Lines, Fittings, and Cooler.	(5)
c. Installation.	(20)
d. Filling and Bleeding System.	(10)
e. Steering Operational Check.	(5)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Plugs.
Gasket, Adapter to Oil Pump (5330-01-071-5727).
Silicone RTV Sealant (Refer to Appendix C).
Power Steering Fluid (Refer to Appendix C).
Snapring, 100475 (15434).
O-Ring, 008771-026 (19954).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-14A or C.	Left Front Fender Removed.
11-16A.	Grille Removed.
4-18A.	Fuel Filter and Adapter Removed (M916 Thru M920 Only).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND OIL COOLER MAINTENANCE (Continued).

CAUTION

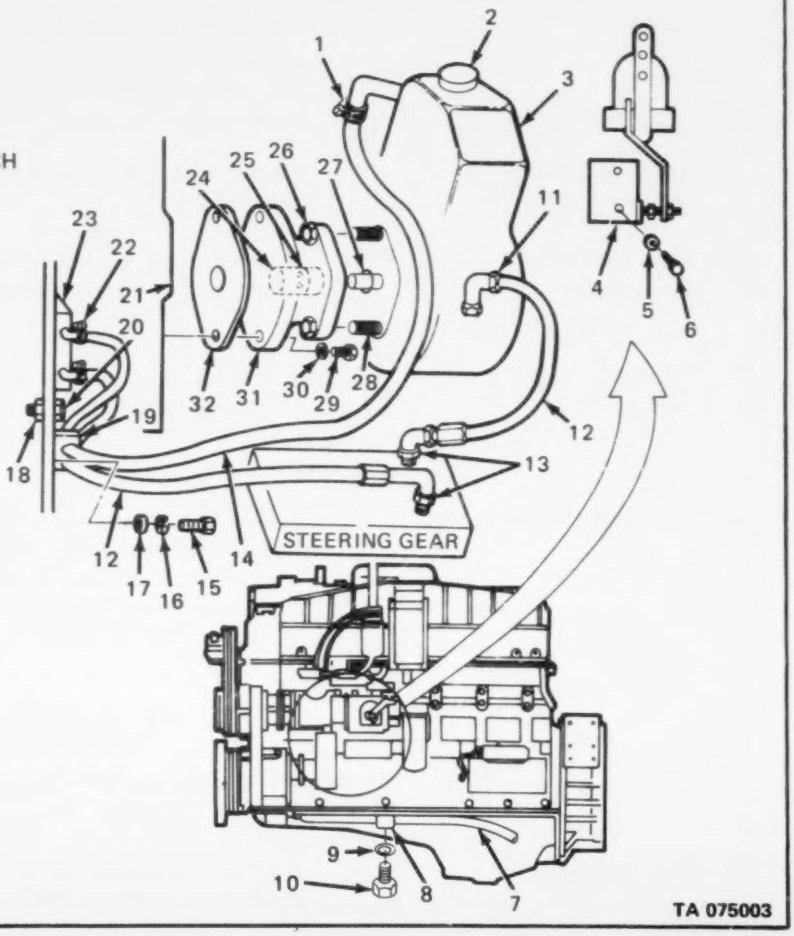
Dirt may severely damage the power steering system. Make sure your work area is clean. Cover openings in the pump to keep dust out.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two capscrews (6) and washers (5).	Remove.	Push engine retarder switch (4) aside.

LEGEND:

1. HOSE CLAMP
2. CAP
3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY
4. ENGINE RETARDER SWITCH
5. WASHER (2)
6. CAPSCREW (2)
7. OIL LINE
8. HOSE STRAP
9. WASHER
10. CAPSCREW
11. FITTING
12. HOSE (2)
13. FITTING (2)
14. HOSE
15. BOLT
16. LOCKWASHER
17. FLATWASHER
18. NUT AND WASHER (4)
19. HOSE RETAINER
20. BOLT AND LOCKWASHER (4)
21. OIL PUMP
22. HOSE CLAMP (2)
23. COOLER
24. COUPLING
25. SNAP RING
26. LOCKNUT (2)
27. O-RING
28. STUD (2)
29. CAPSCREW (2)
30. WASHER (2)
31. ADAPTER
32. GASKET



TA 075003

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Hydraulic pump and reservoir assembly (3).	Wipe away surface dirt and grease.	
NOTE Plug openings as soon as you disconnect lines.		
3. Two hose clamps (22).	Remove.	
4. Bolt (15), lockwasher (16) and flat washer (17).	Unscrew and remove hose retainer (19).	
5. Hose clamp (1).	Remove.	
6. Hose (14).	Remove from upper rear connection on hydraulic pump and reservoir assembly (3) and lower fitting on cooler (23).	Mark location for reassembly.
7. Two fittings (13) and one (11).	Unscrew and remove two hoses (12).	Mark locations for reassembly.
8. Four bolts and lockwashers (20).	Unscrew from four nuts and washers (18); remove cooler (23).	
9. Capscrew (10) and washer (9).	a. Unscrew and remove from hose strap (8). b. Push oil line (7) out of way.	
10. Two locknuts (26).	a. Unscrew and remove. b. Pull hydraulic pump and reservoir assembly (3) free from adapter (31). c. Throw away O-ring (27).	Remove from bottom through frame rail notch (M915). Remove from top over frame rail (M916 thru M920).
NOTE Coupling (24) may fall out when adapter (31) is removed. Do not lose it.		
11. Snapring (25).	Remove from coupling (24); slide coupling from shaft.	Throw away snapring.

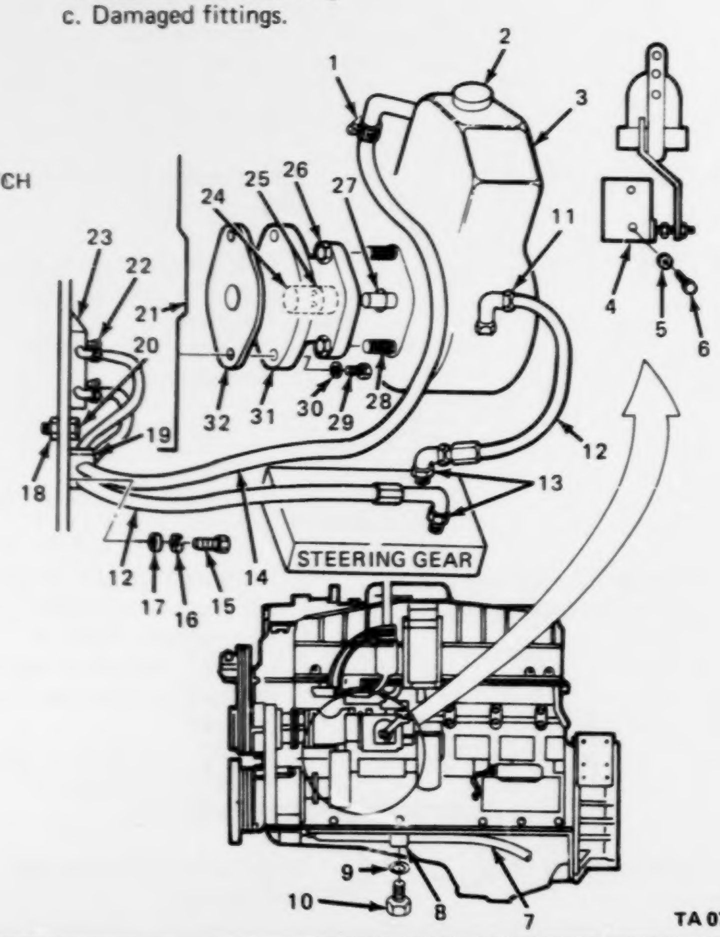
STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
12. Two capscrews (29) and washers (30).	a. Unscrew and remove. b. Remove adapter (31) from oil pump (21). c. Throw away gasket (32).	You may need to tap adapter (31) loose with a brass drift.
13. Two studs (28).	Unscrew from hydraulic pump and reservoir assembly (3).	
B. INSPECTION OF LINES, FITTINGS, AND COOLER.		
14. Two hoses (12) and one hose (14).	Inspect for: a. Cracks. b. Discoloration/staining. c. Damaged fittings.	Replace as necessary.

LEGEND:

1. HOSE CLAMP
2. CAP
3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY
4. ENGINE RETARDER SWITCH
5. WASHER (2)
6. CAPSCREW (2)
7. OIL LINE
8. HOSE STRAP
9. WASHER
10. CAPSCREW
11. FITTING
12. HOSE (2)
13. FITTING (2)
14. HOSE
15. BOLT
16. LOCKWASHER
17. FLATWASHER
18. NUT AND WASHER (4)
19. HOSE RETAINER
20. BOLT AND LOCKWASHER (4)
21. OIL PUMP
22. HOSE CLAMP (2)
23. COOLER
24. COUPLING
25. SNAP RING
26. LOCKNUT (2)
27. O-RING
28. STUD (2)
29. CAPSCREW (2)
30. WASHER (2)
31. ADAPTER
32. GASKET



TA 075004

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSPECTION OF LINES, FITTINGS AND COOLER (Continued).		
15. Oil cooler (23).	Inspect for: a. Bent or broken cooling fins and tubing. b. Debris lodged between fins.	Clean or replace as necessary.
C. INSTALLATION.		
16. Two studs (28).	Screw into hydraulic pump and reservoir assembly (3).	
17. Adapter (31).	a. Coat oil pump side with silicone RTV sealant. b. Put new gasket (32) on oil pump side. c. Attach to oil pump (21) with two capscrews (29) and washers (30).	
18. Coupling (24).	Slide on and install new snapring (25).	
19. Adapter (31).	a. Coat power steering pump side with silicone RTV sealant. b. Put new O-ring (27) in position.	
	NOTE Before installing pump, be sure oil line (7) is pushed out of way.	
20. Hydraulic pump and reservoir assembly (3).	a. Hold with fill cap (2) on top and shaft pointed away from engine. Push up between frame and engine until shaft catches on frame (M915). b. Turn fill cap towards cab. Tilt shaft upwards. Lift into position.	On M916 thru M920, lift pump over frame rail and into position. Pump shaft may have to be turned slightly to aline splines in coupling (24).
21. Two locknuts (26).	Screw onto two studs (28) and tighten.	

STEERING AND ALINEMENT.

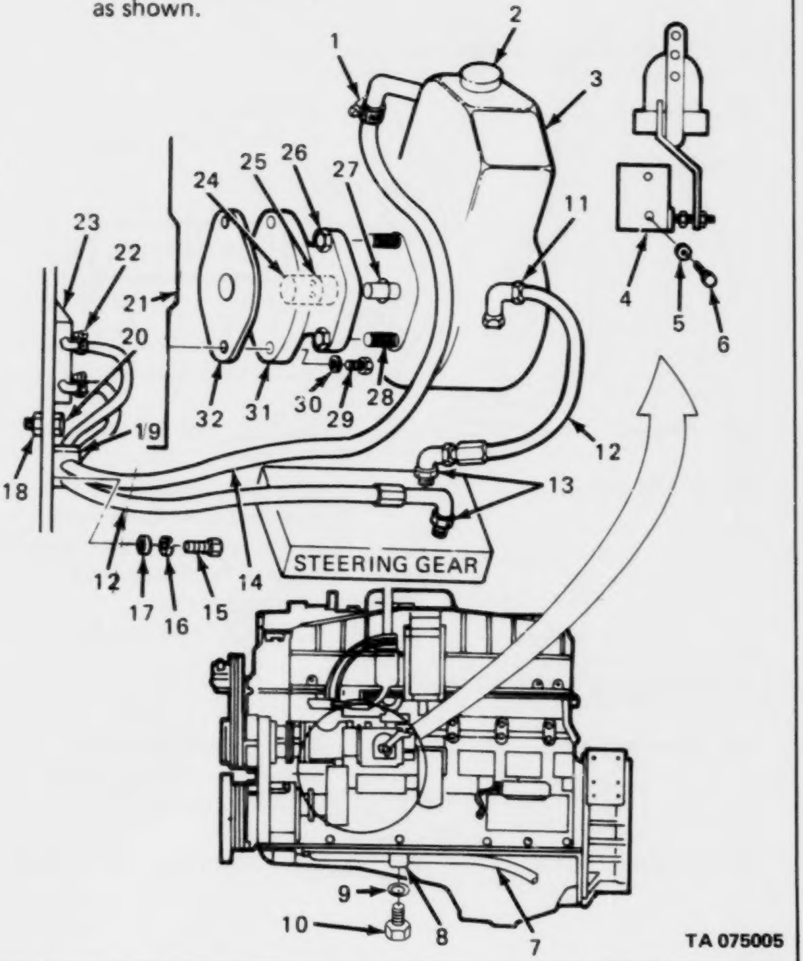
10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

C. INSTALLATION (Continued).

LOCATION/ITEM	ACTION	REMARKS
22. Cooler (23).	a. Aline flange holes with those on front metal. b. Attach with four bolts and lockwashers (20), and four nuts and washers (18).	
23. Two hoses (12) and one hose (14).	a. Unplug openings. b. Fasten with two hose clamps (22), and one hose clamp (1) as shown. c. Screw in two hose fittings (13) and one fitting (11) as shown.	Install in locations marked upon removal.

LEGEND:

1. HOSE CLAMP
2. CAP
3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY
4. ENGINE RETARDER SWITCH
5. WASHER (2)
6. CAPSCREW (2)
7. OIL LINE
8. HOSE STRAP
9. WASHER
10. CAPSCREW
11. FITTING
12. HOSE (2)
13. FITTING (2)
14. HOSE
15. BOLT
16. LOCKWASHER
17. FLATWASHER
18. NUT AND WASHER (4)
19. HOSE RETAINER
20. BOLT AND LOCKWASHER (4)
21. OIL PUMP
22. HOSE CLAMP (2)
23. COOLER
24. COUPLING
25. SNAP RING
26. LOCKNUT (2)
27. O-RING
28. STUD (2)
29. CAPSCREW (2)
30. WASHER (2)
31. ADAPTER
32. GASKET



TA 075005

STEERING AND ALINEMENT.

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
24. Engine retarder switch (4).	Attach to fuel pump with two capscrews (6) and washers (5).	
25. Oil line (7).	Attach with capscrew (10), washer (9), and hose strap (8); tighten capscrew to 18 lb-ft (24 N·m).	
26. Hose retainer (19).	Install over hoses (12) and (14) to front metal with bolt (15), lockwasher (16), and flatwasher (17).	
D. FILLING AND BLEEDING SYSTEM.		
27. Fill cap (2).	a. Remove. b. Add fluid if needed.	Fluid should be checked when warm with engine off.
	CAUTION Be prepared to add fluid to the system as soon as pump begins operating.	
28. Engine.	Start up (see TM 9-2320-273-10).	
29. Filler cap (2).	a. Watch fluid level. If it drops, add more fluid immediately. Continue until fluid stabilizes. b. Replace cap. c. Check for oil leaks.	
E. STEERING OPERATIONAL CHECK.		
30. Steering wheel.	Turn in both directions. Wheel should turn easily with no jogging.	
31. Engine.	Shut down (see TM 9-2320-273-10).	

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Follow-on maintenance required:

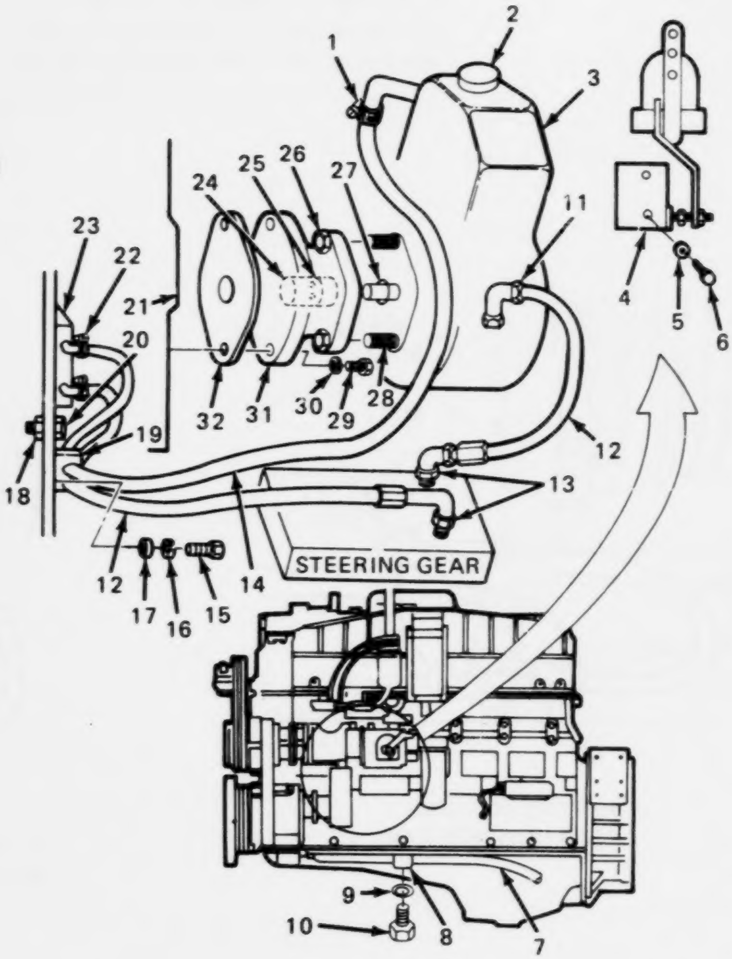
Install fender; refer to paragraph 11-14B or D.

Install grille; refer to paragraph 11-16D.

Install fuel filter and adapter; refer to paragraph 4-18B (M916 thru M920).

LEGEND:

1. HOSE CLAMP
2. CAP
3. HYDRAULIC PUMP AND RESERVOIR ASSEMBLY
4. ENGINE RETARDER SWITCH
5. WASHER (2)
6. CAPSCREW (2)
7. OIL LINE
8. HOSE STRAP
9. WASHER
10. CAPSCREW
11. FITTING
12. HOSE (2)
13. FITTING (2)
14. HOSE
15. BOLT
16. LOCKWASHER
17. FLATWASHER
18. NUT AND WASHER (4)
19. HOSE RETAINER
20. BOLT AND LOCKWASHER (4)
21. OIL PUMP
22. HOSE CLAMP (2)
23. COOLER
24. COUPLING
25. SNAP RING
26. LOCKNUT (2)
27. O-RING
28. STUD (2)
29. CAPSCREW (2)
30. WASHER (2)
31. ADAPTER
32. GASKET



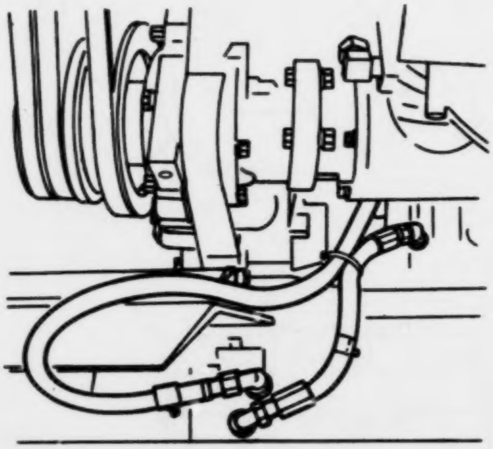
TA 075006

10-22. HYDRAULIC POWER STEERING PUMP AND COOLER MAINTENANCE (Continued).

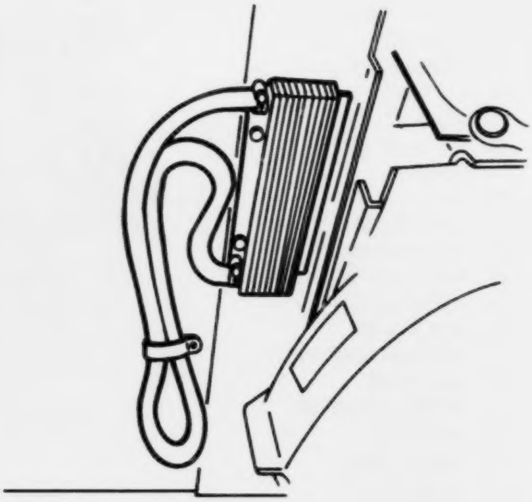
LOCATION/ITEM	ACTION	REMARKS

CAUTION

At temperatures at or below 0°F, the cooler must be disconnected from the power steering fluid system. Failure to do so may cause the cooler tubing to rupture. The proper procedure is to disconnect one hose (12) which runs from the steering gear to the cooler (20) and reconnect same to the hydraulic pump and reservoir assembly (3). Then, the hose from the cooler to the reservoir should be taken off and reconnected to the cooler input per illustration below.



PUMP TO STEERING
GEAR HOSE ROUTING



FLUID COOLER HOSE
ROUTING

TA 075007

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STEERING MECHANISM.

10-23. AUXILIARY CYLINDER (M916 THRU M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(22)
b. Inspection.	(5)
c. Installation.	(30)
d. Operational Check.	(5)
	62 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Container, 1 Pint.
Liquid Teflon (Refer to Appendix C).
Power Steering Fluid (Refer to Appendix C).
Cotter Pin, 103415 (24617).
Cotter Pin, 103389 (24617).
GAA (Refer to Appendix C).
Cable Tie, PLT44-MO (06383).
Cable Tie, MS-3367-2-0 (96906).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-2.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-14C.	Right Front Fender Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

NOTE

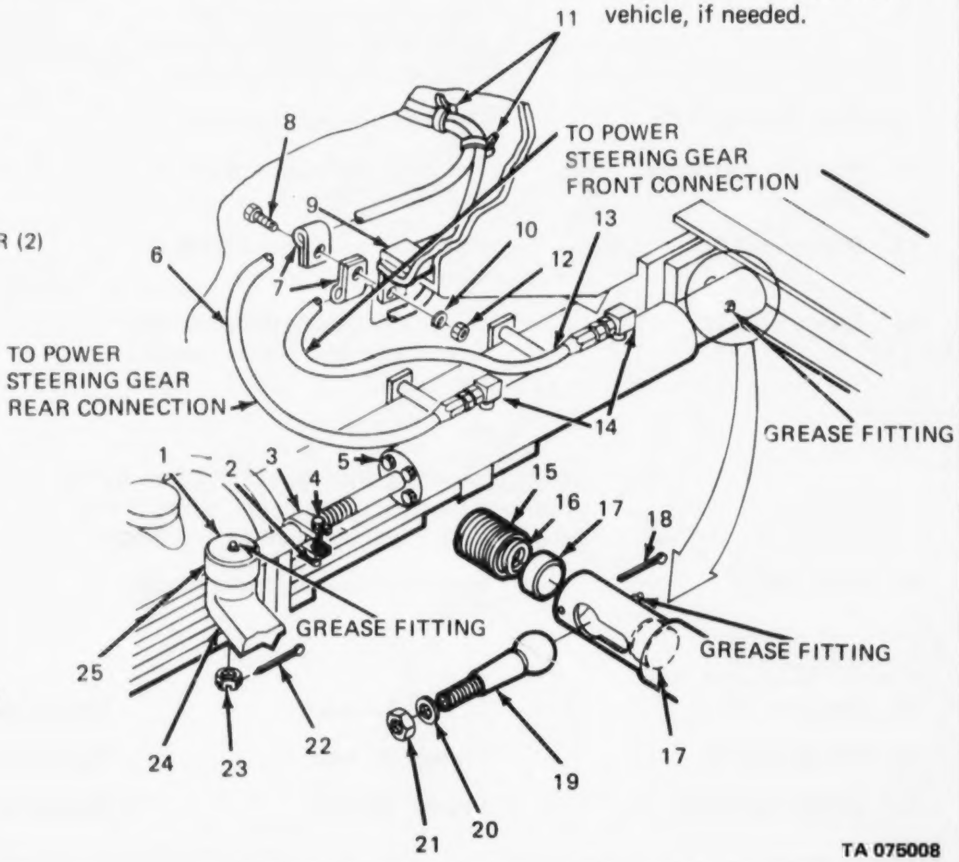
If lines (6) and (13) are to be removed entirely from vehicle, unscrew from bottom of steering gear.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Line (6).	Disconnect from elbow (14) and drain oil.	Approximately 1/2 pint.
2. Line (13).	Disconnect from elbow (14) and drain oil.	Approximately 1/2 pint.
3. Bolt (8), lockwasher (10) and nut (12).	Unscrew and remove two hose retainers (7) from bracket (9).	
4. Two cable ties (11).	Snip off.	Discard. Lines (6) and (13) may now be removed from vehicle, if needed.

LEGEND:

1. BALL JOINT
2. CLAMP NUT
3. CLAMP
4. CLAMP BOLT
5. CYLINDER
6. LINE
7. HOSE RETAINER (2)
8. BOLT
9. BRACKET
10. LOCKWASHER
11. CABLE TIE (2)
12. NUT
13. LINE
14. FITTING (2)
15. END CAP
16. SPRING
17. BALL CUP (2)
18. COTTER PIN
19. BALL JOINT
20. WASHER
21. NUT
22. COTTER PIN
23. NUT
24. STEERING ARM
25. RUBBER BOOT


11
8
TO POWER STEERING GEAR FRONT CONNECTION
9
10
13
12
6
7
TO POWER STEERING GEAR REAR CONNECTION
14
GREASE FITTING
1
2
3
5
4
15
16
17
18
GREASE FITTING
GREASE FITTING
25
24
23
22
21
20
19
17

TA 075008

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. Two fittings (14).	Unscrew and remove.	
6. Cotter pin (22).	Remove and throw away.	
7. Nut (23).	Remove.	
8. Ball joint (1).	Remove from steering arm (24).	Tap out with hammer.
9. Rubber boot (25).	Lift out of steering arm (24).	
10. Cotter pin (18).	Remove and throw away.	
11. End cap (15), spring (16), and outer ball cup (17).	Unscrew end cap (15) and remove cap, spring, and outer ball cup.	
12. Cylinder (5).	Line up ball portion of slot with head of ball joint (19) and remove from ball. Set cylinder (5) with ball joint (1) and clamp (3) on bench.	
13. Inner ball cup (17).	Remove from cylinder (5).	
14. Nut (21) and washer (20).	Remove from back side of ball joint (19) stud.	
15. Ball joint (19).	Remove from frame mounting plate.	
16. Clamp nut (2).	See NOTE below, then unscrew from clamp bolt (4) and remove clamp (3).	

NOTE

Before proceeding with step (17), count number of threads showing between ball joint (1) and cylinder (5) on cylinder shaft for installation.

LOCATION/ITEM	ACTION	REMARKS
17. Ball joint (1).	Unscrew from shaft on cylinder (5).	
B. INSPECTION.		
18. Ball joint (1).	Inspect for wear.	Replace as necessary.
19. Ball joint (19).	Inspect for wear.	Replace as necessary.
20. Steering arm (24).	Inspect for wear.	Replace as necessary.

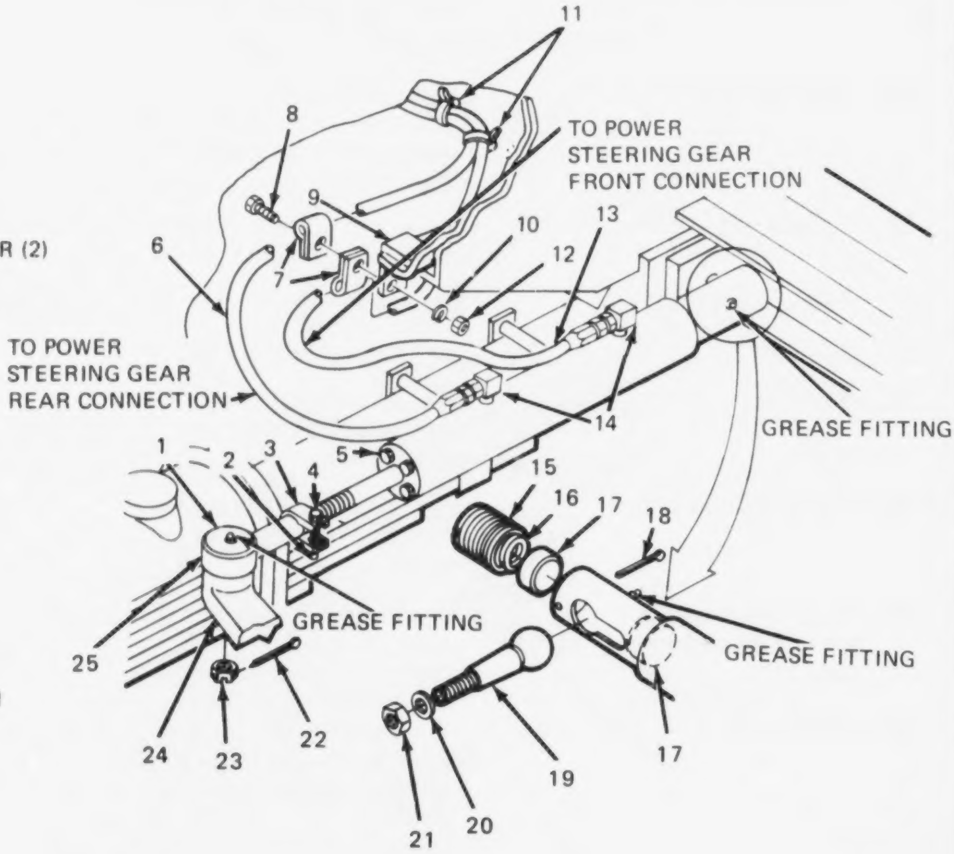
10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

B. INSPECTION (Continued).

LOCATION/ITEM	ACTION	REMARKS
21. Cylinder (5).	Hole worn (out of round). Inspect for: a. Wear. b. Dents c. Cracks.	Replace as necessary.
22. Spring (16).	Inspect for coil breaks.	Replace as necessary.
23. Two ball cups (17).	Inspect for wear or scoring.	Replace as necessary.
24. Rubber boot (25).	Inspect for tears or cracking.	Replace as necessary.

LEGEND:

1. BALL JOINT
2. CLAMP NUT
3. CLAMP
4. CLAMP BOLT
5. CYLINDER
6. LINE
7. HOSE RETAINER (2)
8. BOLT
9. BRACKET
10. LOCKWASHER
11. CABLE TIE (2)
12. NUT
13. LINE
14. FITTING (2)
15. END CAP
16. SPRING
17. BALL CUP (2)
18. COTTER PIN
19. BALL JOINT
20. WASHER
21. NUT
22. COTTER PIN
23. NUT
24. STEERING ARM
25. RUBBER BOOT


11
8
TO POWER STEERING GEAR FRONT CONNECTION
9
10
13
6
12
7
TO POWER STEERING GEAR REAR CONNECTION
14
GREASE FITTING
1
2
3
5
4
15
16
17
18
GREASE FITTING
GREASE FITTING
25
24
23
22
21
20
19
17

TA 075009

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION.		
25. Ball joint (1).	Screw onto shaft of cylinder (5).	Screw on shaft until same number of threads that were showing on disassembly are showing now.
26. Clamp (3).	Slide over ball joint arm and secure with clamp bolt (4) and clamp nut (2).	
27. Ball joint (19).	Slide joint stud through the frame mounting plate. Use mallet if necessary.	
28. Nut (21) and washer (20).	a. Screw onto stud of ball joint (19) and tighten. b. Apply GAA to ball.	
29. Inner ball cup (17).	a. Apply GAA to cup surface. b. Slide into cylinder end until seated with cup surface facing out.	
30. Cylinder (5).	Line up ball portion of slot and slide over ball joint (19).	
31. Rubber boot (25).	Place in steering arm (24).	Small end down.
32. Ball joint (1).	Insert in steering arm (24).	
33. Nut (23).	Screw on until tight, then advance nut for cotter pin hole alinement.	
34. New cotter pin (22).	Insert through hole in stud of ball joint (1) and bend tabs over.	
35. Outer ball cup (17), spring (16) and end cap (15).	a. Apply GAA to ball face of cup (17) outer. b. Insert outer cup into cylinder with cup face inward toward ball (19). c. Slide spring (16) into cylinder and seat against outer cup flat face. d. Screw in cap (15) until flush. e. Aline cap slot with next cotter pin hole in cylinder.	

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

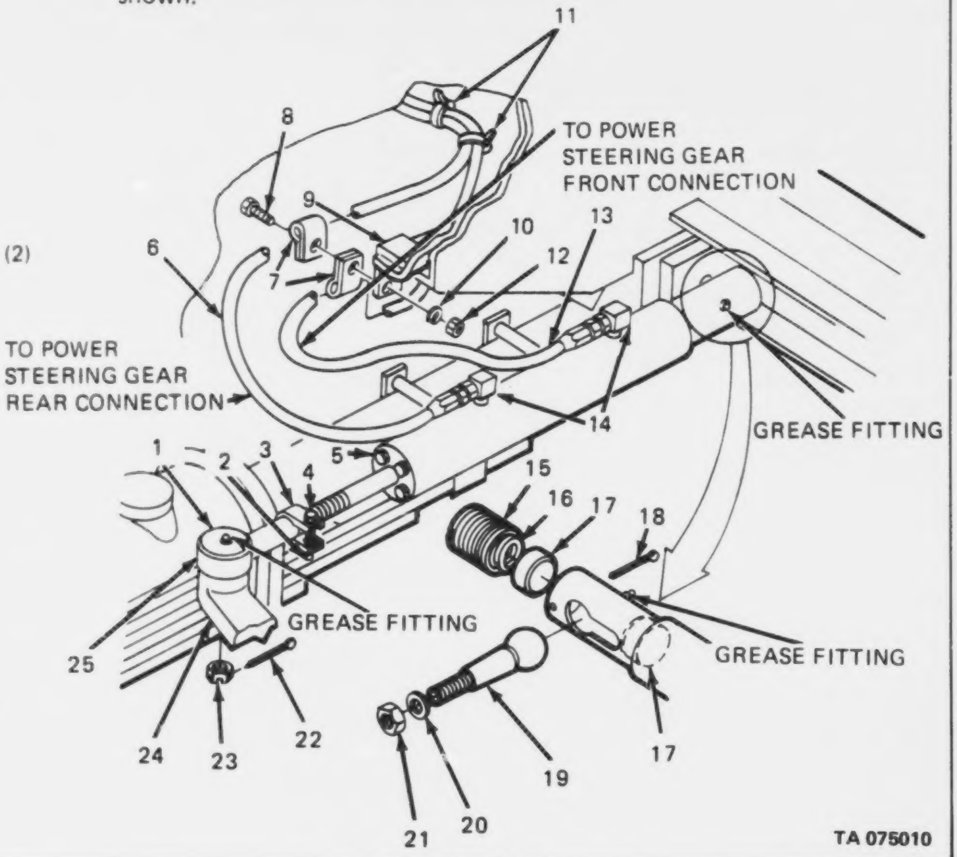
LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
36. New cotter pin (18).	Install through cylinder end and bend over tabs.	
37. Two fittings (14).	Apply liquid teflon to threads; insert in cylinder and tighten; advance so that line end faces up.	
38. Line (6).	Install to one elbow (14) and tighten in position shown.	
39. Line (13).	Install to one elbow (14) and tighten in position shown.	

NOTE

If lines (6) and (13) were removed from vehicle, install to bottom of steering gear in positions shown.

LEGEND:

1. BALL JOINT
2. CLAMP NUT
3. CLAMP
4. CLAMP BOLT
5. CYLINDER
6. LINE
7. HOSE RETAINER (2)
8. BOLT
9. BRACKET
10. LOCKWASHER
11. CABLE TIE (2)
12. NUT
13. LINE
14. FITTING (2)
15. END CAP
16. SPRING
17. BALL CUP (2)
18. COTTER PIN
19. BALL JOINT
20. WASHER
21. NUT
22. COTTER PIN
23. NUT
24. STEERING ARM
25. RUBBER BOOT


11
8
TO POWER STEERING GEAR FRONT CONNECTION
9
10
13
6
12
7
TO POWER STEERING GEAR REAR CONNECTION
14
GREASE FITTING
1
2
3
5
4
15
16
17
18
GREASE FITTING
GREASE FITTING
25
24
23
22
21
20
19
17

TA 075010

STEERING AND ALINEMENT.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
40. Two hose retainers (7).	Place over lines (6) and (13) and secure to bracket (9) with bolt (8), lockwasher (10), and nut (12).	
41. Two new cable ties (11).	Install around two lines (6) and (13) and front cross frame tube.	
42. Cylinder (5).	Lubricate with GAA at two ball joint grease fittings as shown.	
43. Power steering fluid level.	Check (refer to LO 9-2320-273-12).	

NOTE

Follow on maintenance action required: Install fender; refer to paragraph 11-14D.

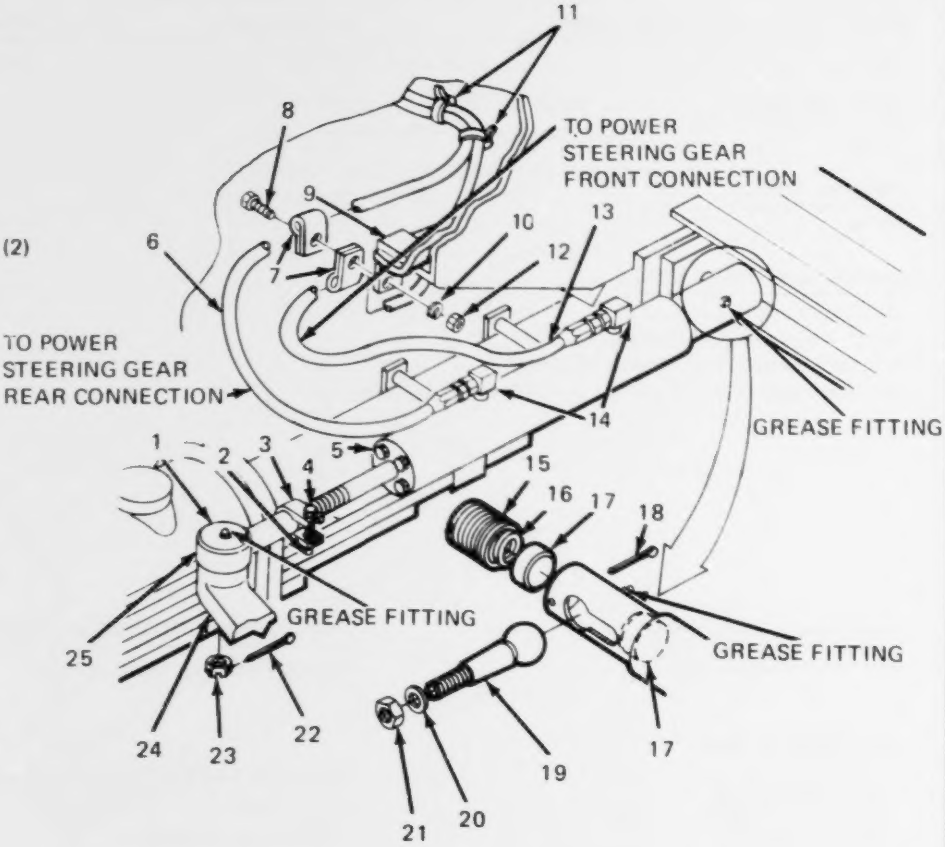
LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK.		
44. Engine.	Start up.	Refer to TM 9-2320-273-10.
45. Wheels.	Turn all the way to left and to right.	
46. Cylinder (5), line (6) and line (13).	Check for leaks.	Tighten as necessary.
47. Engine.	Shut down.	Refer to TM 9-2320-273-10.

10-23. AUXILIARY CYLINDER (M916 THRU M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS

LEGEND:

1. BALL JOINT
2. CLAMP NUT
3. CLAMP
4. CLAMP BOLT
5. CYLINDER
6. LINE
7. HOSE RETAINER (2)
8. BOLT
9. BRACKET
10. LOCKWASHER
11. CABLE TIE (2)
12. NUT
13. LINE
14. FITTING (2)
15. END CAP
16. SPRING
17. BALL CUP (2)
18. COTTER PIN
19. BALL JOINT
20. WASHER
21. NUT
22. COTTER PIN
23. NUT
24. STEERING ARM
25. RUBBER BOOT


11
8
TO POWER
STEERING GEAR
FRONT CONNECTION
9
10
13
6
12
7
TO POWER
STEERING GEAR
REAR CONNECTION
14
GREASE FITTING
1
2
3
5
4
15
16
17
18
GREASE FITTING
GREASE FITTING
25
24
23
22
19
17
21
20

TA 075714

SUSPENSION SYSTEM.

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Cleaning and inspection.	(10)
c. Installation.	(10)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).
Shock Absorbers (2) (2540-00-740-9617).
Rubber Bushings (8) (6365-00-740-9618).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

SUSPENSION SYSTEM.

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

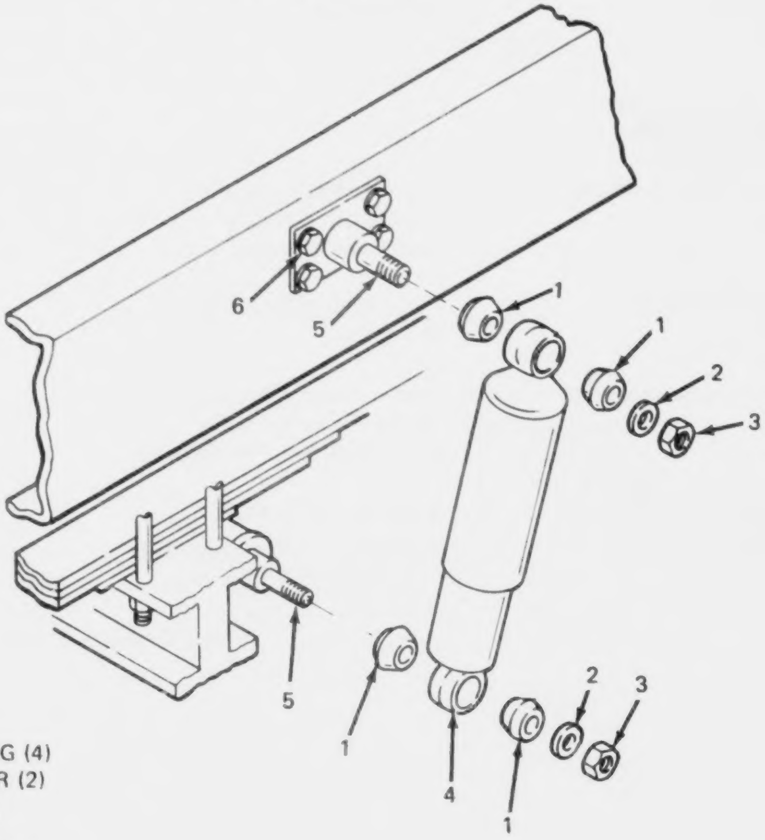
NOTE

a. Shock absorbers should be replaced in pairs. Perform the following procedure twice, once on each side of the truck.

b. Shock absorbers should be replaced if:

  1. Spring action is not dampened, indicating worn shock absorbers.
  2. Fluid leakage is noted on outer shock absorber surfaces; bottom section .

c. Procedure is written based upon need for new shock absorbers.



LEGEND:

1. BUSHING (4)
2. WASHER (2)
3. NUT (2)
4. SHOCK ABSORBER
5. SHAFT (2)
6. NUT, WASHER AND BOLT (4)

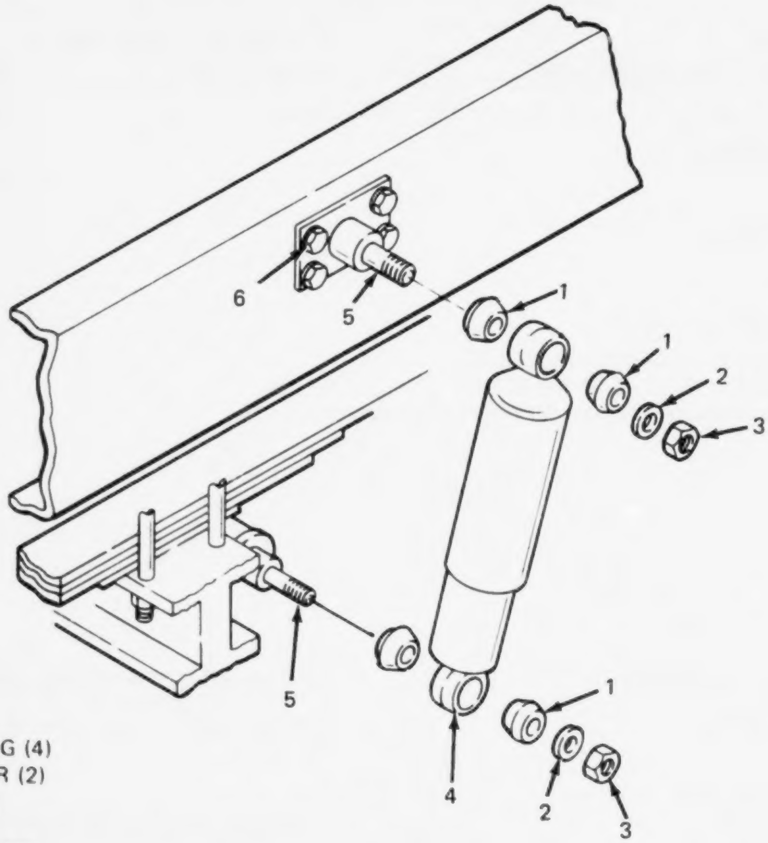
TA 075011

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (3).	Unscrew and remove from axle and two shafts (5).	
2. Two washers (2), four bushings (1), and shock absorbers (4).	Remove.	
B. CLEANING AND INSPECTION.		
3. Clean and inspect shaft thread (5) and nuts (3).	a. Clean in solvent and blow dry. b. Apply GAA to threads.	Replace shafts if threads are worn or damaged. a. Replace upper shaft (5) by removing four bolts, nuts and washers. b. Notify Direct Support Maintenance for replacement of lower shaft (5).
C. INSTALLATION.		
4. Two new inner bushings (1).	Place on axle and two shafts (5) with large ends toward truck.	
5. New shock absorber (4).	Place against bushings on shafts (5).	
6. Two new outer bushings (1).	Place on axle and two shafts (5) with small ends toward shock absorber.	
7. Two washers (2) and nuts (3).	a. Screw on to shafts (5). b. Tighten nuts to 125-165 lb-ft (170-224 N·m).	

10-24. FRONT AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. BUSHING (4)
2. WASHER (2)
3. NUT (2)
4. SHOCK ABSORBER
5. SHAFT (2)
6. NUT, WASHER AND BOLT (4)

TA 075012

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Cleaning and Inspection.	(10)
c. Installation.	(10)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M917, M919, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Shock Absorbers (2) (2540-01-011-0614).
Rubber Bushings (8) (6365-00-740-9618).
Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

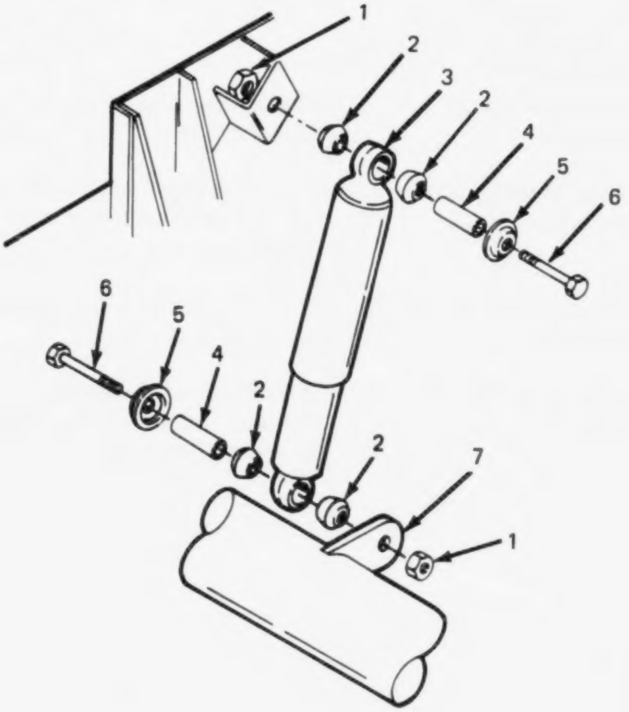
Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Shock absorbers should be replaced in pairs. Perform the following procedures twice, once on each side of the truck. Shock absorbers should be replaced if spring action is not dampened or if fluid leakage is noted on outer shock absorber surfaces, bottom section. This procedure is based upon need for new shock absorbers.



LEGEND:

1. NUT (2)
2. BUSHING (4)
3. SHOCK ABSORBER
4. SLEEVE (2)
5. SPACER (2)
6. BOLT (2)
7. BRACKET

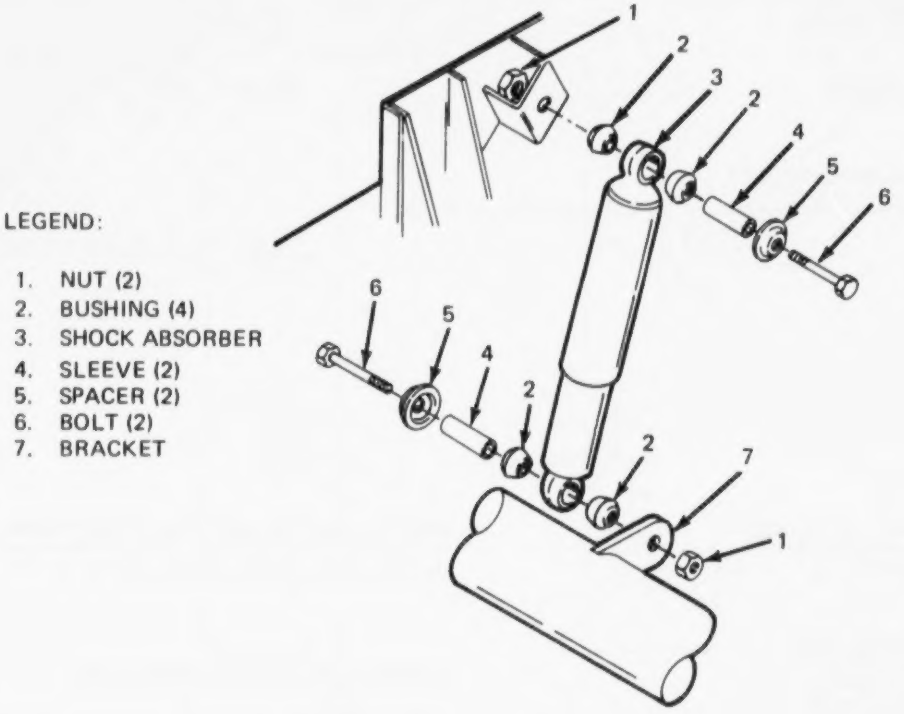
TA 075013

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (1).	Unscrew and remove.	
2. Four bushings (2), two spacers (5), two bolts (6), two sleeves (4) and shock absorber (3).	Pull bolt (6) out to disassemble spacers (4), bushings (2) and sleeves (4).	
B. CLEANING AND INSPECTION.		
3. Bolts (6) and nuts (1).	a. Soak in non-flammable solvent and wipe dry.	Replace as necessary.
	b. Inspect threads for wear, chips, and crossed threads.	
C. INSTALLATION.		
4. Two new bushings (2) and sleeve (4).	Place in top end of shock absorber (3).	Small ends of bushings should face shock absorber.
5. New shock absorber (3) and spacer (5).	Attach to top bracket with nut (1) and bolt (6) in order illustrated.	
6. Two new bushings (2) and sleeve (4).	Place in bottom end of shock absorber (3).	Small ends of bushings should face shock absorber.
7. New shock absorber (3) and spacer (5).	Attach to bottom bracket (7) with nut (1) and bolt (6) in order illustrated.	

10-25. PUSHER AXLE SHOCK ABSORBERS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. NUT (2)
2. BUSHING (4)
3. SHOCK ABSORBER
4. SLEEVE (2)
5. SPACER (2)
6. BOLT (2)
7. BRACKET

TA 075014

SUSPENSION SYSTEM.

10-26. TORQUE RODS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal (M915).	(5)
b. Removal (M916 Thru M920).	(10)
c. Cleaning and Inspection (All).	(10)
d. Installation (M915).	(10)
e. Installation (M916 Thru M920).	(15)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Nonflammable Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 10-3.

SPECIAL ENVIRONMENTAL CONDITIONS

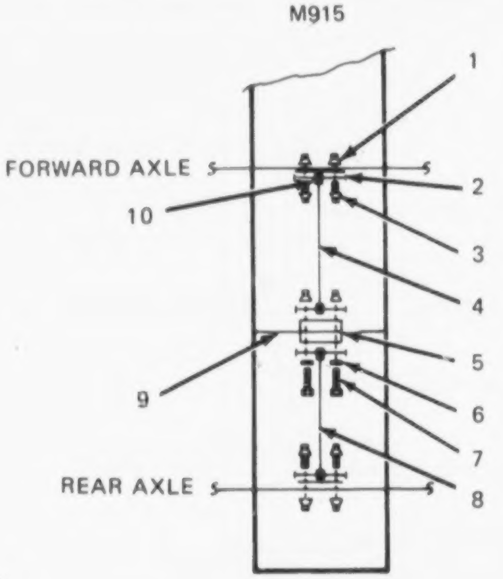
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

10-26. TORQUE RODS MAINTENANCE (Continued).

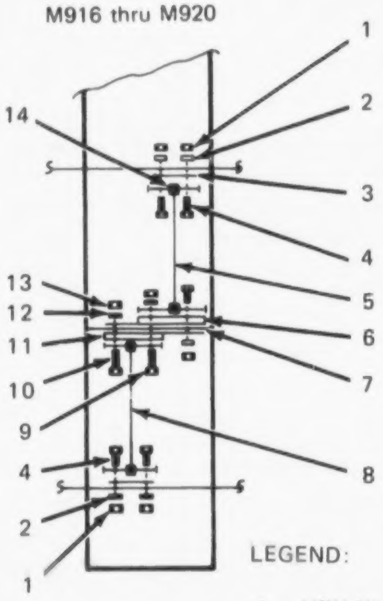
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (M915).		
1. Four washer base nuts (1) and four washer base bolts (3).	Unscrew and remove from two axle brackets (2) and torque rods (4) and (8).	
2. Two hex head bolts (7), two flat washers (6), and two washer base nuts (1).	Unscrew and remove from center torque rod connections at shim sets (5).	Shim sets (5) may drop from cross-member (9) when torque rods are removed.
3. Torque rods (4) and (8).	Remove.	



REAR OF CHASSIS

LEGEND:

1. HEX NUT (7)
2. FLAT WASHER (7)
3. AXLE BRACKET (2)
4. BOLT (7)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. PLATE
10. RUBBER BUSHING (4)



REAR OF CHASSIS

LEGEND:

1. HEX NUT (4)
2. FLAT WASHER (4)
3. AXLE BRACKET (2)
4. BOLT (4)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. BOLT
10. BOLT (2)
11. PLATE
12. FLAT WASHER (3)
13. HEX NUT (3)
14. RUBBER BUSHING (4)

TA 075015

SUSPENSION SYSTEM.

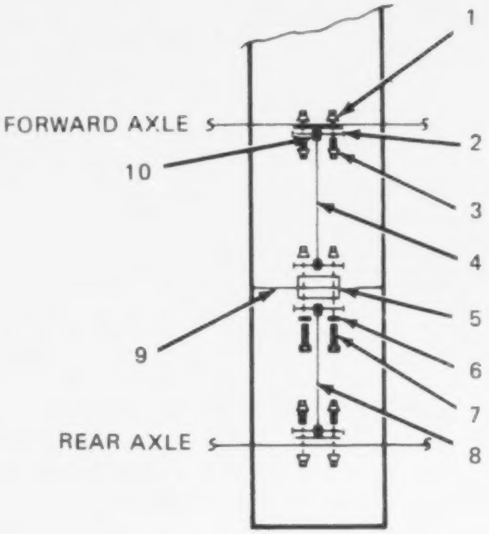
10-26. TORQUE RODS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. REMOVAL (M916 THRU M920).		
4. Four hex nuts (1), flatwashers (2), and bolts (4).	Unscrew and remove from two axle brackets (3) and torque rods (5) and (8).	
5. Two hex nuts (13), flatwashers (12), and bolts (10).	Unscrew and remove from center torque rod connections at shim sets (6).	Shim sets (6) may drop from cross-member (7) and cross-member plates(11)when torque rods are removed. Plates(11)are welded to cross-member (7).
6. Hex nut (13), flatwasher (12), and bolt (9).	Unscrew and remove from center torque rod connections at shim sets (6).	
7. Torque rods (5) and (8).	Remove.	
C. CLEANING AND INSPECTION (ALL).		
8. Fasteners (1), (2), and (4) plus shim block sets (5) (M915) or (6) (M916 thru M920).	Clean in solvent and wipe dry. Inspect for: a. Crossed threads. b. Burrs. c. Egg shaped holes (5) or (6).	Replace as necessary.
9. Torque rod rubber bushings (14).	Wipe clean and inspect for: a. Egg shaped bushing b. Deterioration and cracking.	
D. INSTALLATION (M915).		
10. Torque rods (4) and (8), shim block sets (5).	Aline mounting holes with those in cross member (9).	
11. Two hex head bolts (7), flat washer base nuts (1).	Install bolts through torque rods (4) and (8), shim block sets (5) and cross-member (9), washers and nuts as illustrated. Torque to 105 lb-ft (142 N·m).	

10-26. TORQUE RODS MAINTENANCE (Continued).

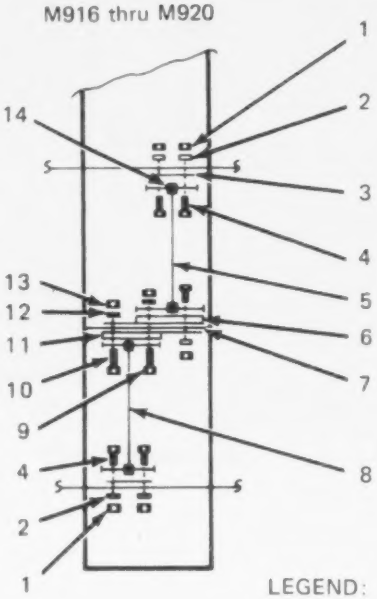
LOCATION/ITEM	ACTION	REMARKS
D. INSTALLATION (M915) (Continued).		
12. Torque rod (4) and (8), axle brackets (2).	Aline mounting holes.	
13. Four washer base bolts (3) and washer base nuts (1).	Install bolts through outer torque rod ends and fasten to axle brackets (2) with nuts (1). Torque to 105 lb-ft (142 N·m).	

M915



REAR OF CHASSIS

M916 thru M920



REAR OF CHASSIS

LEGEND:

1. HEX NUT (7)
2. FLAT WASHER (7)
3. AXLE BRACKET (2)
4. BOLT (7)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. PLATE
10. RUBBER BUSHING (4)

LEGEND:

1. HEX NUT (4)
2. FLAT WASHER (4)
3. AXLE BRACKET (2)
4. BOLT (4)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. BOLT
10. BOLT (2)
11. PLATE
12. FLAT WASHER (3)
13. HEX NUT (3)
14. RUBBER BUSHING (4)

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10-26. TORQUE RODS MAINTENANCE (Continued).

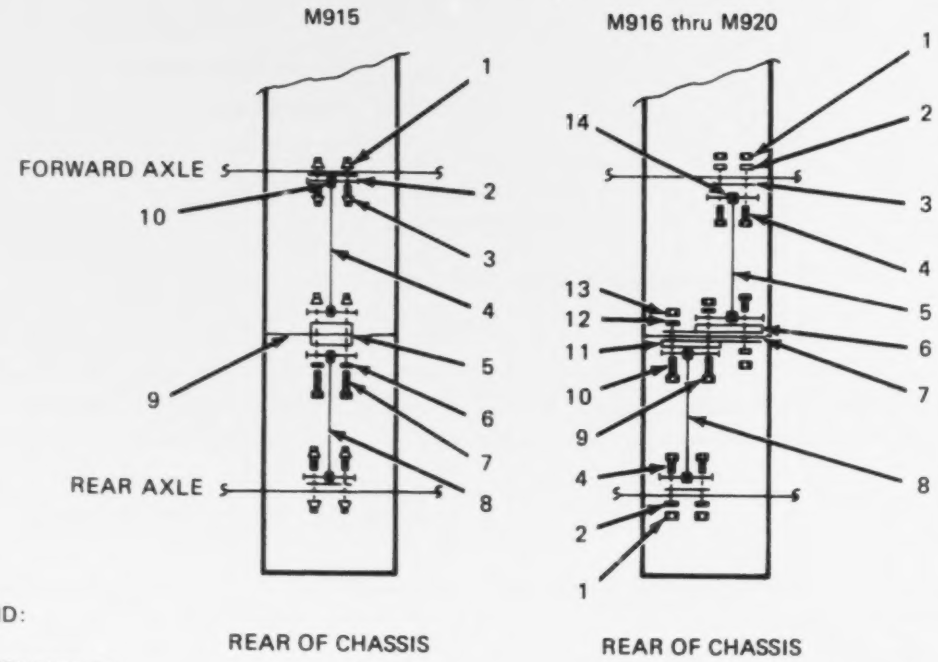
E. INSTALLATION (M916 THRU M920).

LOCATION/ITEM	ACTION	REMARKS
14. Torque rods (5) and (8), shim block sets (6).	Aline mounting holes with those in cross member (7) and cross member plates (11).	
15. Three bolts (9) and (10), flatwashers (12) and hex nuts (13).	Install bolts through torque rods (5) and (8), shim block sets (6), cross member plates (11)and cross member (7) as illustrated. Install washers and nuts. Torque to 180 lb-ft (244 N·m).	
16. Torque rods (5) and (8), axle brackets (3).	Aline mounting holes.	
17. Four bolts (4), flat washers (2), and hex nuts (1).	Install bolts through outer torque rod ends and fasten to axle brackets (3) with washers (2) and nuts (1). Torque to 180 lb-ft (142 N·m).	

SUSPENSION SYSTEM.

10-26. TORQUE RODS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


M915
FORWARD AXLE
REAR AXLE
1
2
3
4
5
6
7
8
9
10
REAR OF CHASSIS
M916 thru M920
1
2
3
4
5
6
7
8
9
10
11
12
13
14
4
2
1
REAR OF CHASSIS

LEGEND:

1. HEX NUT (7)
2. FLAT WASHER (7)
3. AXLE BRACKET (2)
4. BOLT (7)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. PLATE
10. RUBBER BUSHING (4)

LEGEND:

1. HEX NUT (4)
2. FLAT WASHER (4)
3. AXLE BRACKET (2)
4. BOLT (4)
5. TORQUE ROD
6. SHIM SET
7. CROSS MEMBER
8. TORQUE ROD
9. BOLT
10. BOLT (2)
11. PLATE
12. FLAT WASHER (3)
13. HEX NUT (3)
14. RUBBER BUSHING (4)

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CHAPTER 11

FRAME, BODY AND CAB MAINTENANCE

11-1. OVERVIEW.

This chapter provides you with the following information related to frame, body and cab maintenance:

a. All required special tools and equipment.
b. Other technical manuals.
c. Troubleshooting procedures.
d. Maintenance procedures.

CAUTION

a. Do not drill holes in frame flanges.
b. Do not weld frame.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

11-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

11-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the frame, body and cab maintenance procedures described in this chapter are limited to the 1000-lb hoist and lift hook. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustrations.)

11-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

11-5. INTRODUCTION.

Table 11-1 contains instructions for troubleshooting the frame components. The corrective actions describe how to fix a problem or refer to a procedure for fixing the problem. The Troubleshooting table is arranged by malfunctions in the following order:

FRAME :

a. Towing pintle does not pivot or latch, or jaw is stuck (Malfunction No. 1).

b. Excessive jerking of towed trailer (Malfunction No. 2).

c. Excessive noise or popping sounds from fifth wheel when turning (Malfunction No. 3).

Table 11-1. Frame Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. TOWING PINTLE DOES NOT PIVOT OR LATCH, OR JAW IS STUCK:

Step 1. Check for proper lubrication.

Lubricate (LO 9-2320-273-12).

Step 2. Check lock for damage.

Replace (para 11-10).

2. EXCESSIVE JERKING OF TOWED TRAILER:

Step 1. Check for proper lubrication of fifth wheel.

Lubricate (LO 9-2320-273-12).

Step 2. Check bolts and bracket on fifth wheel for tightness.

Tighten, refer to torque table (para 3-9).

Step 3. Inspect coupler jaw and locks for damage.

Replace fifth wheel (para 11-13).

3. EXCESSIVE NOISE OR POPPING SOUNDS FROM FIFTH WHEEL WHEN TURNING:

Step 1. Check for proper lubrication of fifth wheel.

Lubricate (LO 9-2320-273-12).

Step 2. Check all mounting bolts on fifth wheel for tightness.

Tighten, refer to torque table (para 3-9).

Step 3. Inspect locks for damage.

Replace fifth wheel (para 11-13).

Section III MAINTENANCE PROCEDURES

11-6. INTRODUCTION.

This section provides you with Organizational Level Maintenance procedures for the frame, body, and cab. To find a specific maintenance procedure, see one of the following task summaries.

a. Frame (para 11-7).

b. Body and Cab (para 11-8).

11-7. FRAME MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10).	Spare Wheel/Tire Removed.
11-16E.	Brush Guard Removed (M916 Thru M920).

TEST EQUIPMENT

None.

TOOLS

1,000 lb Hoist.
Lift Hook.
M916 and M920 5th Wheel Adjustment Tool (CT447ALX2).

MATERIALS/PARTS (P/N)

- Lithium (Chassis) Grease (Refer to Appendix C).
- Cotter Pin, 108656 (24617).
- GAA (Refer to Appendix C).
- Cotter Pin, 773 (74410).
- Sleeve (M915), 188-4-VM (97706).
- Sleeve (M916), S409-1SB (75535).
- Cable (M915), 1/8 x 15/7 x 19 (75535).
- Cable (M916), 1/8 x 15 ft/7 x 19 (75535).

PERSONNEL REQUIRED

One MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
LO 9-2320-273-12
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 11-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK		TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Bumper and Towing Eyes Maintenance:		11-9	11-1
	A.	Removal.	11-9A	
	B.	Installation.	11-9B	
2.	Pintle Maintenance (M915 thru M917 and M920):		11-10	11-1
	A.	Removal.	11-10A	
	B.	Cleaning and Inspection.	11-10B	
	C.	Installation.	11-10C	
	D.	Lubrication and Adjustment.	11-10D	

11-7. FRAME MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
3.	Spare Tire Hoist Cable (M915 and M916):	11-11	11-1
	A. Removal.	11-11A	
	B. Installation.	11-11B	
4.	Spare Tire Hoist Maintenance (M915 and M916):	11-12	11-1
	A. Removal.	11-12A	
	B. Installation.	11-12B	
5.	Fifth Wheel Maintenance:	11-13	11-1
	A. Removal.	11-13A	
	B. Lubrication.	11-13B	
	C. Adjustment.	11-13C	
	D. Installation.	11-13D	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

TOOLS

None.

MATERIALS/PARTS (P/N)

Lubriplate (Refer to Appendix C).
GAA (Refer to Appendix C).
Non Flammable Cleaning Solvent (SD-2) (Refer to Appendix C).
Cotter Pin, 137155 (24617)
Rivet (10), SSLQ-66 (05693).
Rivet (30), SSLQ-64 (05693).
Grease Gun.
Electrical Tape.
Clean Container.
Hose Tie (3), PLT 4H-MO (06383).
Hoist.
Jack Stands.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-26A.	Heater Removed.
11-14A or C.	Fenders Removed.
11-20A and 11-21A.	Seats Removed.
4-25A.	Air Cleaner Removed.
4-42A.	Coolant Drained.
5-44A.	Headlamp Assembly Removed.
11-16E.	Brush Guard Removed (M916 Thru M920)
11-16A.	Grille Removed.
11-32A.	Hood Removed.
11-19A.	Mud Flaps Removed.
11-9A.	Tow Eyes Removed.
5-50A.	Blackout Taillamps Removed.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM

TM 9-2320-273-10.
LO 9-2320-273-12.
TM 9-2320-273-20P.

REFERENCES (TROUBLESHOOTING)

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Fender Maintenance:	11-14	
	A. Removal of Front Fender (M915).	11-14A	
	B. Installation of Front Fender (M915).	11-14B	
	C. Removal of Front Fender (M916 thru M920).	11-14C	
	D. Installation of Front Fender (M916 thru M920).	11-14D	
	E. Removal of Rear Fender.	11-14E	
	F. Installation of Rear Fender.	11-14F	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
2.	Ventilator Maintenance:	11-15	
	A. Removal.	11-15A	
	B. Installation.	11-15B	
3.	Grille Maintenance:	11-16	
	A. Removal.	11-16A	
	B. Disassembly.	11-16B	
	C. Assembly.	11-16C	
	D. Installation.	11-16D	
	E. Brush Guard Removal.	11-16E	
	F. Brush Guard Installation.	11-16F	
4.	Optional Winter Front Maintenance:	11-17	
	A. Original Installation.	11-17A	
	B. Removal.	11-17B	
	C. Installation	11-17C	
5.	Grille Support Brackets Maintenance:	11-18	
	A. Removal.	11-18A	
	B. Installation.	11-18B	
6.	Mud Flaps Maintenance :	11-19	
	A. Removal.	11-19A	
	B. Installation.	11-19B	
7.	Driver's Seat Maintenance:	11-20	
	A. Removal.	11-20A	
	B. Cleaning and Lubricating of Hardware.	11-20B	
	C. Installation	11-20C	
8.	Passenger's Seat Maintenance:	11-21	
	A. Removal.	11-21A	
	B. Cleaning and Lubricating Adjusting Mechanism.	11-21B	
	C. Installation.	11-21C	
9.	Seat Riser and Tool Box Maintenance:	11-22	
	A. Removal.	11-22A	
	B. Installation.	11-22B	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
10.	Windshield Wiper and Blade Assembly Maintenance:	11-23	
	A. Removal.	11-23A	
	B. Installation.	11-23B	
	C. Operational Check.	11-23C	
11.	Windshield Wiper Arms Maintenance:	11-24	
	A. Removal.	11-24A	
	B. Installation.	11-24B	
	C. Operational Check.	11-24C	
12.	Rear View Mirror Maintenance:	11-25	
	A. Removal.	11-25A	
	B. Disassembly.	11-25B	
	C. Assembly.	11-25C	
	D. Installation.	11-25D	
	E. Adjustment.	11-25E	
13.	Heater Maintenance:	11-26	4-1
	A. Removal.	11-26A	
	B. Installation.	11-26B	
14.	Heater Hose Maintenance:	11-27	4-1
15.	Heater Control Panel Maintenance:	11-28	4-1
	A. Removal of Knob and Cable.	11-28A	
	B. Installation of Knob and Cable.	11-28B	
	C. Operational Check.	11-28C	
16.	Heater Control Valve Maintenance:	11-29	4-1
	A. Removal.	11-29A	
	B. Installation.	11-29B	

11-8. BODY AND CAB MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
17.	Heater Air Ducts Maintenance:	11-30	4-1
	A. Removal.	11-30A	
	B. Installation.	11-30B	
	C. Checking for Leaks.	11-30C	
18.	Data and Instruction Plates Maintenance:	11-31	
19.	Hood Maintenance:	11-32	
	A. Removal.	11-32A	
	B. Installation.	11-32B	
20.	Tail Roller Maintenance:	11-33	
	A. Removal.	11-33A	
	B. Installation.	11-33B	

FRAME.

11-9. BUMPER AND TOWING EYES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal. (15)
b. Installation. (15)
30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Cotter Pin, 108656 (24617).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-16E	Brush Guard Removed (M916 Thru M920).

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
Table 11-1.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine Off.
Transmission In Neutral.
Park Brake Set.

FRAME.

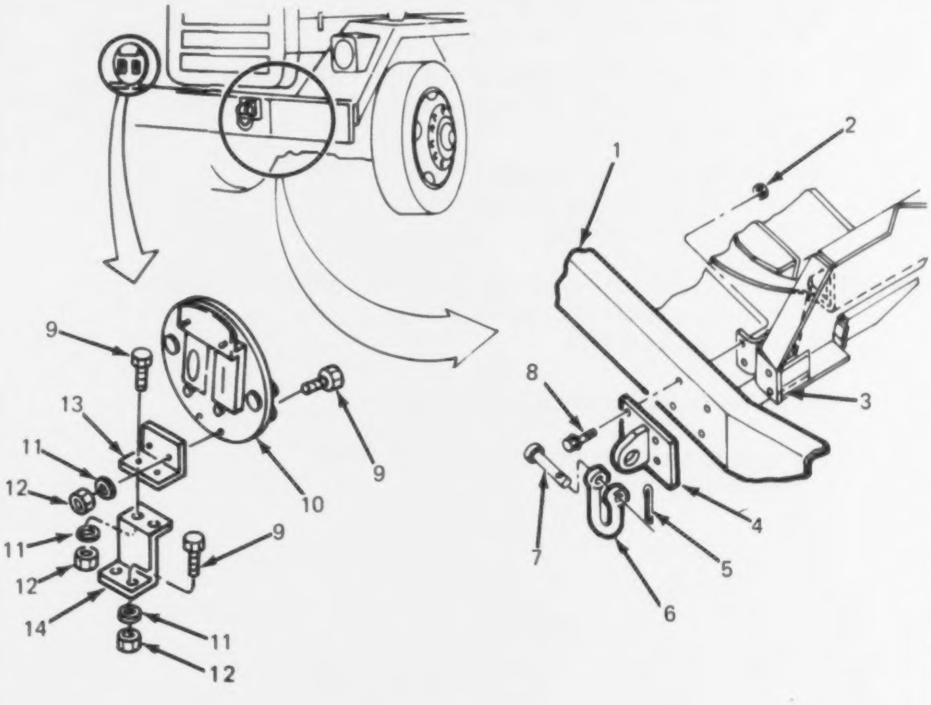
11-9. BUMPER AND TOWING EYES MAINTENANCE.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two cotter pins (5).	Remove and throw away.	
2. Clevis (6) and pin (7).	Slide pin (7) out and remove clevis (6).	
3. Four screws (9), washers (11),and nuts (12).	Unscrew and remove classification sign (10) and bracket (13).	M915 thru M920.
4. Two screws (9), washers (11), and nuts (12).	Unscrew and remove bracket (14).	M916 thru M920.

NOTE

Before removing capscrews (8) support bumper to keep it from falling.

LOCATION/ITEM	ACTION	REMARKS
5. Eight capscrews (8) and nuts (2).	Unscrew and remove.	If you want to change a single towing eye, remove only the four capscrews on that side.



LEGEND:

1. BUMPER
2. NUT (8)
3. FRONT EXTENSION (2)
4. TOWING EYE (2)
5. COTTER PIN (2)
6. CLEVIS (2)
7. PIN (2)
8. CAPSCREW (8)
9. CAPSCREW (6)
10. CLASSIFICATION SIGN
11. WASHER (6)
12. NUT (6)
13. BRACKET
14. BRACKET

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FRAME.

11-9. BUMPER AND TOWING EYES MAINTENANCE (Continued).

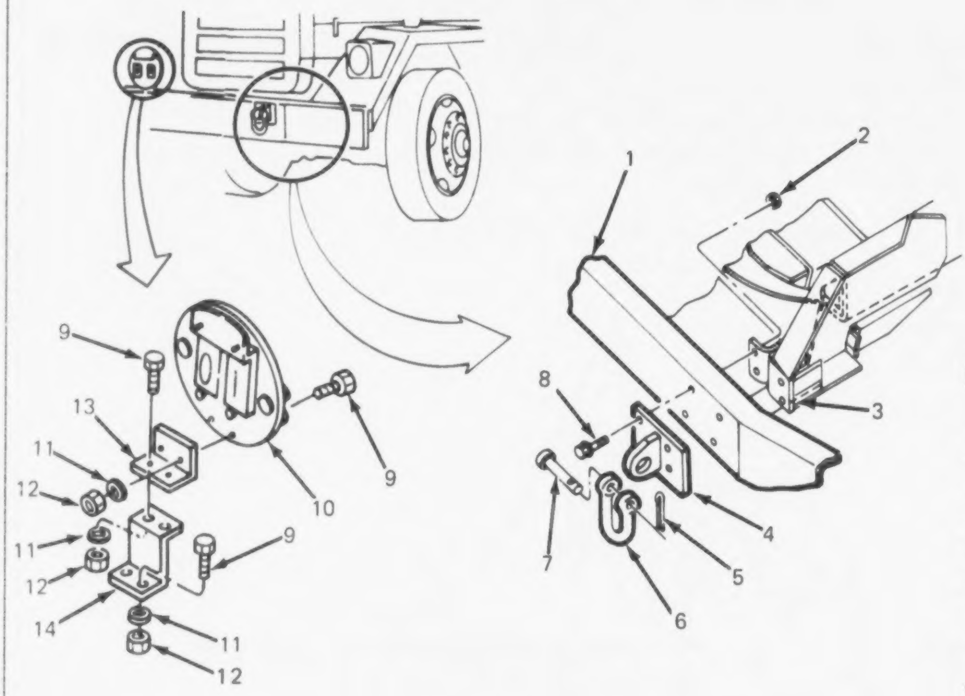
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
6. Bumper (1) and two towing eyes (4).	a. Remove. b. Inspect for rust or damage.	 Replace if necessary.
B. INSTALLATION.		
7. Bumper (1).	Put in place against front extension (3).	
8. Two towing eyes (4) and eight capscrews (8).	Put eyes in place and insert capscrews.	
9. Eight nuts (2).	Put on; tighten capscrews (8) and nuts (2).	
10. Clevis (6).	Position, slide in pin (7), and secure with new cotter pin (5).	
11. Bracket (14).	Install to bumper (1) with two screws (9), washers (11) and nuts (12).	M916 thru M920.
12. Bracket (13).	a. Install to bracket (14) with two screws (9), washers (11), and nuts (12).	M916 thru M920.
	b. Install to bumper (1) with two screws (9), washers (11), and nuts (12).	M915.
13. Classification sign (10).	Install to bracket (13) with two screws (9), washers (11), and nuts (12).	M915 thru M920.

Follow-on maintenance action required:

Install brush guard (M916 thru M920 only); refer to para 11-16F.

11-9. BUMPER AND TOWING EYES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


2
1
9
13
11
12
10
9
11
9
12
14
11
12
8
3
4
7
5
6

LEGEND:

1. BUMPER
2. NUT (8)
3. FRONT EXTENSION (2)
4. TOWING EYE (2)
5. COTTER PIN (2)
6. CLEVIS (2)
7. PIN (2)
8. CAPSCREW (8)
9. CAPSCREW (6)
10. CLASSIFICATION SIGN
11. WASHER (6)
12. NUT (6)
13. BRACKET
14. BRACKET

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FRAME.

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Cleaning and Inspection.	(15)
c. Installation.	(20)
d. Lubrication and Adjustment.	(15)
	65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915 Thru M917 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Lithium (Chassis) Grease (Refer to Appendix C).
Cotter Pin, 773 (74410).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 11-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

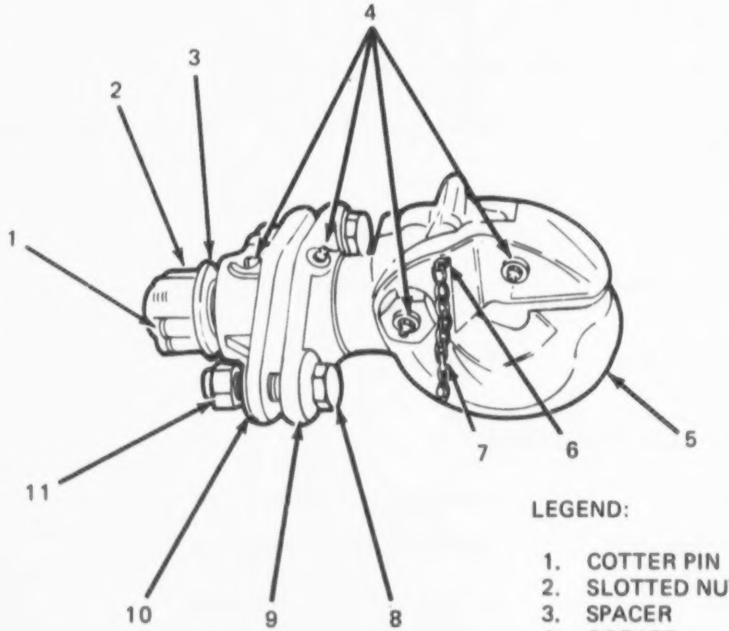
11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).

A. REMOVAL.

	LOCATION/ITEM	ACTION	REMARKS
1.	Cotter Pin (1).	Remove and discard.	
2.	Slotted nut (2) and spacer (3).	a. Unscrew and remove. b. Remove hook assembly (5).	

NOTE

If you do not need to remove brackets (9) go directly to step 6.



LEGEND:

1. COTTER PIN
2. SLOTTED NUT
3. SPACER
4. GREASE FITTING (4)
5. HOOK ASSEMBLY
6. COTTER PIN
7. CHAIN
8. CAPSCREW (2)
9. BRACKET (2)
10. WASHER (2)
11. NUT (2)

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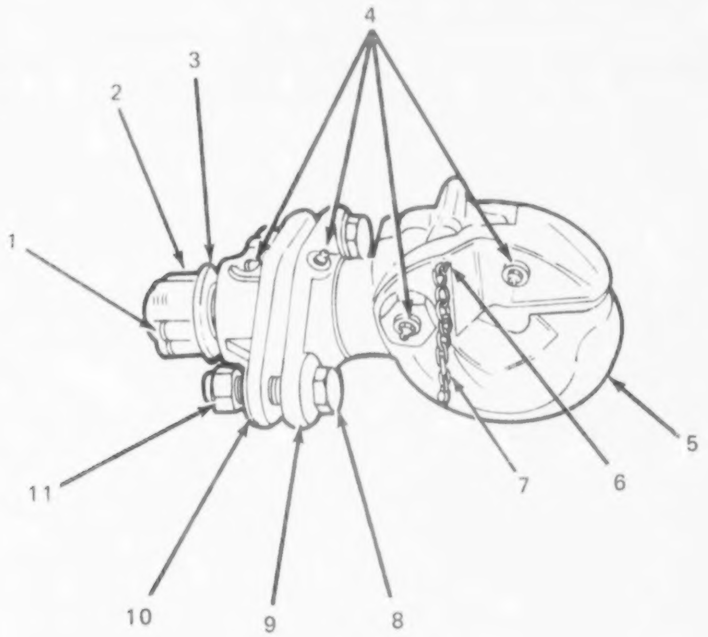
11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Two capscrews (8), washers (10), nuts (11).	a. Unscrew and remove. b. Remove two brackets (9).	
B. CLEANING AND INSPECTION.		
4. Cotter pin (6).	Remove from hook assembly (5) and spread jaws.	Check that chain (7) is securely riveted to hook assembly (5) and that links are not damaged.
5. All parts.	Clean and lubricate with diesel fuel or suitable light oil. Inspect for signs of damage or wear and replace as necessary.	
C. INSTALLATION.		
6. Two brackets (9).	Hold in position.	
7. Two capscrews (8), washers (10) and nuts (11).	Screw in loosely.	Insure grease fittings face down.
8. Hook assembly (5).	Push through bracket (9) from back end.	
9. Spacer (3) and slotted nut (2).	Screw on loosely.	
10. Two capscrews (8) and nuts (11).	Tighten.	
D. LUBRICATION AND ADJUSTMENT.		
11. Cotter pin (6)	Install in hook assembly (5).	
12. Four grease fittings (4).	Apply grease with grease gun.	
13. Slotted nut (2).	a. Tighten until pintle hook binds when turned. b. Loosen just until hook turns with some resistance.	
14. New cotter pin (1).	a. Insert to hold slotted nut (2) in place. b. Spread ends.	

11-10. PINTLE MAINTENANCE (M915 THRU M917 AND M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. COTTER PIN
2. SLOTTED NUT
3. SPACER
4. GREASE FITTING (4)
5. HOOK ASSEMBLY
6. COTTER PIN
7. CHAIN
8. CAPSCREW (2)
9. BRACKET (2)
10. WASHER (2)
11. NUT (2)

TA 075021

11-11. SPARE TIRE HOIST CABLE (M915 AND M916).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915 and M916.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Sleeve (M915), 188-4-VN (97706).
Sleeve (M916), S409-1SB (75535).
Cable (M915), 1/8 x 15/7 x 19 (75535).
Cable (M916), 1/8 x 15 ft/7 x 19 (75535).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 11-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10).	Spare Wheel and Tire Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

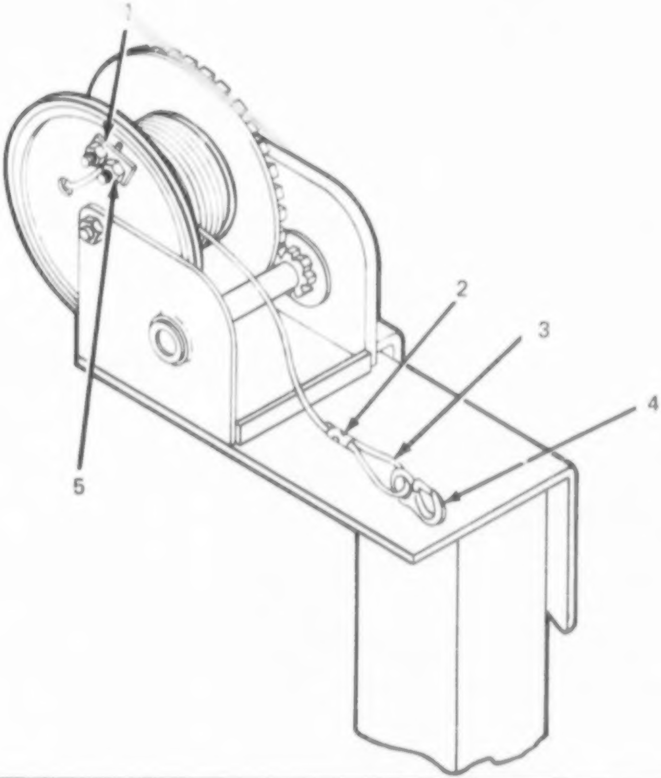
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

11-11. SPARE TIRE HOIST CABLE (M915 AND M916) (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Two nuts (5).	Loosen.	
2. Cable (3).	Unwind. Pull cable end out from under clamp (1) and remove.	
3. Hook (4).	Remove by cutting old cable (3).	
B. INSTALLATION.		
4. New cable (3).	Install sleeve (2), pass thru hook (4), place end of cable thru other side of sleeve (2) and secure with suitable crimping tool.	
5. Cable (3).	Insert under clamp (1).	
6. Two nuts (5).	Tighten.	



LEGEND:
1. CLAMP
2. SLEEVE
3. CABLE
4. HOOK
5. NUT (2)

TA 075022

11-12. SPARE TIRE HOIST MAINTENANCE (M915 and M916).

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal	(30)
b. Installation.	(35)
	65 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915 and M916.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 11-1.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
(See TM 9-2320-273-10).	Spare Wheel and Tire Removed.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

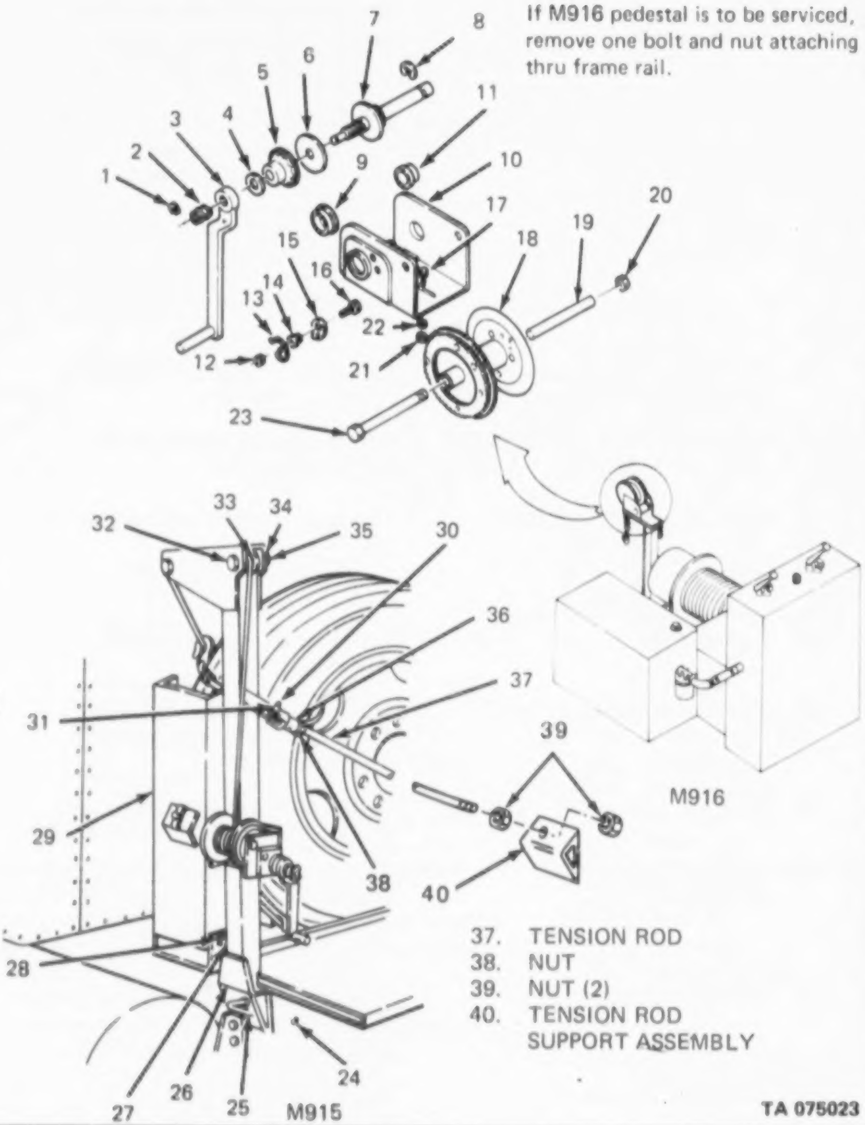
Engine Off.
Transmission in Neutral.
Park Brake Set.

11-12. SPARE TIRE HOIST MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four screws (17), washers (22), and nuts (21).	Unscrew and remove frame (10) with assembled hoist from pedestal (26).	
2. Retaining ring(1).	Remove.	
3. Spring (2), handle (3), and disk (4).	Remove.	NOTE If M916 pedestal is to be serviced, remove one bolt and nut attaching thru frame rail.

LEGEND:

1. RETAINING RING
2. SPRING
3. HANDLE
4. DISK
5. RATCHET GEAR
6. BRAKE FACE
7. PINION SHAFT ASSEMBLY
8. RETAINING RING
9. BUSHING
10. FRAME & PLATE ASSEMBLY
11. BUSHING
12. LOCKNUT
13. RATCHET SPRING
14. RATCHET SPACER
15. RATCHET PAWL
16. RATCHET BOLT
17. MOUNTING SCREW (4)
18. DRUM ASSEMBLY
19. FRAME SPACER
20. LOCKNUT
21. MOUNTING NUT (4)
22. MOUNTING WASHER (4)
23. SCREW
24. PEDESTAL MOUNTING NUT (2)
25. TIE DOWN
26. PEDESTAL
27. NUT (2)
28. BOLT (2)
29. CARRIER
30. COTTER PIN
31. CLEVIS PIN
32. BOLT (2)
33. CABLE ROLLER (2)
34. WASHER (2)
35. NUT (2)
36. CLEVIS



37. TENSION ROD
38. NUT
39. NUT (2)
40. TENSION ROD SUPPORT ASSEMBLY

TA 075023

FRAME.

11-12. SPARE TIRE HOIST MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Screw (23) and locknut (20).	Unscrew and remove frame spacer (19) and drum assembly (18).	
5. Retaining ring (8).	Remove, slide pinion shaft assembly (7) to side and remove brake face (6), and ratchet gear (5).	
6. Ratchet bolt (16) and locknut (12).	Unscrew and remove ratchet spring (13), ratchet spacer (14), and ratchet pawl (15).	
7. Bushings (9), and (11).	Remove.	
8. Cotter pin (30) and clevis pin (31).	Remove and unscrew clevis (36) from tension rod (37).	Discard cotter pin.
9. Three nuts (38) and (39).	Unscrew and remove tension rod (37) from tension rod support assy (40) and clevis (36).	Nut (38) attaches to clevis (36) and two nuts (39) attach at either side of tension rod support assy (40).
10. Tie down (25) and two pedestal mounting nuts (24).	Unscrew and remove pedestal (26).	
11. Two bolts (32), washers (34), and nuts (35).	Unscrew and remove two cable rollers (33).	
12. Two bolts (28) and nuts (27).	Unscrew and remove carrier (29).	
B. INSTALLATION.		
13. Carrier (29).	Install with two bolts (28) and nuts (27).	
14. Two cable rollers (33).	Install to pedestal (26) with two bolts (32), washers (34), and nuts (35).	
15. Pedestal (26).	Install with tie down (25) and two pedestal mounting nuts (24).	
16. Tension Rod (37).	Install with three nuts (38) and (39) to tension rod support assy (40) and clevis (36).	Nut (38) attaches to clevis (36) and two nuts (39) attach at either side of tension rod support assy (40).
17. Clevis (36).	Screw onto tension rod (37) and fasten to pedestal with clevis pin (31) and new cotter pin (30).	
18. Bushings (9) and (11).	Install in frame (10).	

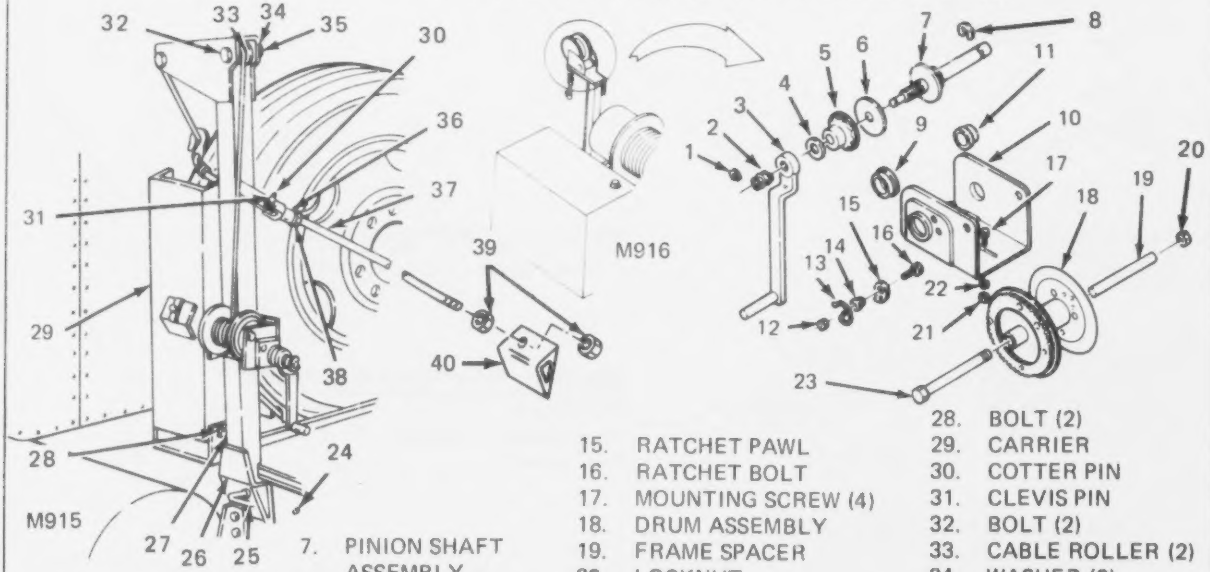
11-12. SPARE TIRE HOIST MAINTENANCE (M915 and M916) (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
19. Ratchet spring (13), ratchet spacer (14), and ratchet pawl (15).	Install to frame (10) with ratchet bolt (16) and locknut (12).	
20. Ratchet gear (5), brake face (6).	Install on pinion shaft (7), slide shaft (7) into frame (10), and fasten with retaining ring (8).	
21. Spacer (19) and drum (18).	Install to frame (10) with screw (23) and nut (20).	
22. Disk (4), handle (3), and spring (2).	Install on pinion shaft (7) and fasten with retaining ring (1).	
23. Frame (10) with assembled hoist.	Install to pedestal (26) with four screws (17), washers (22), and nuts (21).	

NOTE

Follow on maintenance required:

Install spare tire and wheel (see TM 9-2320-273-10).



LEGEND:

1. RETAINING RING
2. SPRING
3. HANDLE
4. DISK
5. RATCHET GEAR
6. BRAKE FACE
7. PINION SHAFT ASSEMBLY
8. RETAINING RING
9. BUSHING
10. FRAME & PLATE ASSEMBLY
11. BUSHING
12. LOCKNUT
13. RATCHET SPRING
14. RATCHET SPACER
15. RATCHET PAWL
16. RATCHET BOLT
17. MOUNTING SCREW (4)
18. DRUM ASSEMBLY
19. FRAME SPACER
20. LOCKNUT
21. MOUNTING NUT (4)
22. MOUNTING WASHER (4)
23. SCREW
24. PEDESTAL MOUNTING NUT (2)
25. TIE DOWN
26. PEDESTAL
27. NUT (2)
28. BOLT (2)
29. CARRIER
30. COTTER PIN
31. CLEVIS PIN
32. BOLT (2)
33. CABLE ROLLER (2)
34. WASHER (2)
35. NUT (2)
36. CLEVIS
37. TENSION ROD
38. NUT
39. NUT (2)
40. TENSION ROD SUPPORT ASSEMBLY

TA 075024

11-13. FIFTH WHEEL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Lubrication.	(10)
c. Adjustment.	(10)
d. Installation.	(25)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M920

TEST EQUIPMENT

None.

SPECIAL TOOLS

1,000 Lb Hoist.
Lift Hook.
M916 and M920 Fifth Wheel Adjustment Tool (CT447ALX2).

MATERIALS/PARTS (P/N)

GAA (Refer to Appendix C).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

TROUBLESHOOTING REFERENCES

Table 11-1.

FRAME.

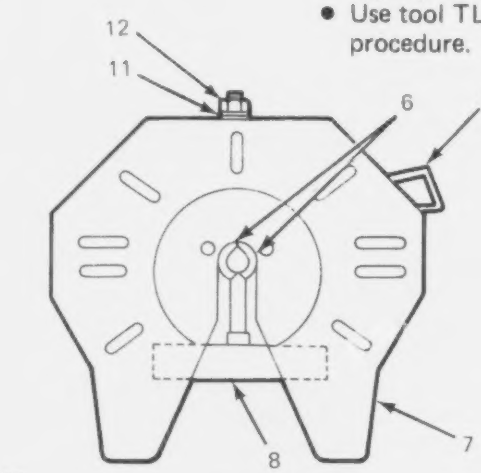
11-13. FIFTH WHEEL MAINTENANCE.

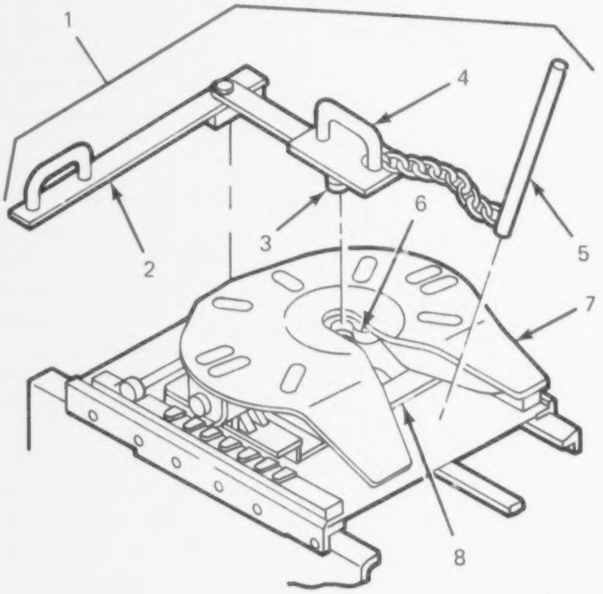
LOCATION/ITEM	ACTION	REMARKS

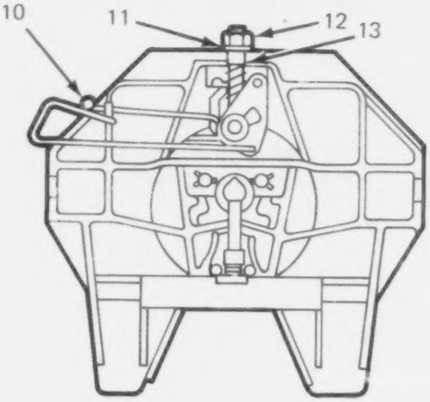
A. ADJUSTMENT (M915 ONLY).

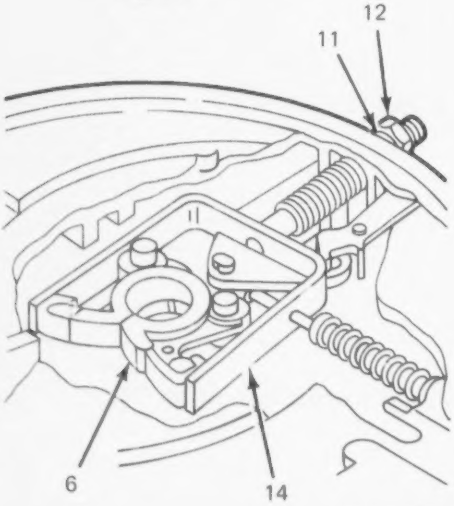
NOTE

- Clean 5th wheel thoroughly before making adjustment.
- Use tool TLN 1000 in the following procedure.









LEGEND:

1. FIFTH WHEEL LOCK TESTER
2. LEVER
3. KING PIN
4. KING PIN PLATE
5. BAR
6. LOCK JAW (2)
7. FIFTH WHEEL PLATE ASSY
8. GROSS TIE
9. RELEASE HANDLE
10. SECONDARY LOCK HANDLE
11. LOCK ADJUSTING TAG
12. HEXAGON HEAD NUT
13. RUBBER BLOCK
14. YOKE

TA 237248

11-13. FIFTH WHEEL MAINTENANCE (Continued).

A. ADJUSTMENT (M915 ONLY) (Continued).

NOTE

To install the fifth wheel lock tester, the fifth wheel lock jaws must be open. Do step 1 to open lock jaws, if necessary.

LOCATION/ITEM	ACTION	REMARKS
1. Secondary lock handle (10) release handle (9), and lock jaws (6).	a. Pull out secondary lock handle (10) until it catches on the 5th wheel plate assembly (7).	
	b. Pull out release handle and pry open lock jaws (6).	
2. 5th wheel lock tester (1).	a. Grasp handle of king pin plate (4) and place king pin (3) into lock jaws (6).	
	b. Place lever (2) over front of 5th wheel plate assembly (7).	
	c. While pushing down on king pin plate (4), rotate lever (2), away from 5th wheel plate assembly (7) until king pin (3) is locked in lock jaws (6).	Be sure king pin plate (4) is flat against 5th wheel plate assembly (7) during this operation.
	d. Position bar (5) over edge of cross tie (8).	
	e. Pry forward with lever (2) and rearward with bar (5) to check for play (1/8" (.31 cm) or less).	Do step 3 to adjust lock jaws (6), if necessary.
3. Nut (11).	a. Turn nut counter-clockwise to allow for yoke (13) to slide down and reposition on the lock jaws (6).	
	b. Tighten nut (11) until rubber block (12) fits snugly against the 5th wheel plate assembly, but still can be turned by hand.	If there is still play after adjusting lock jaws (6), refer to Direct Support and General Support Maintenance.
4. Fifth wheel lock tester (1).	a. Rotate lever (2) towards 5th wheel plate assembly (7).	
	b. Position bar (5) on edge of cross tie (8), using leverage remove king pin (3) from lock jaws (6).	

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

A. ADJUSTMENT (M915 ONLY) (Continued).

NOTE

Repeat this procedure to verify proper adjustment of fifth wheel.

Follow-on maintenance action required:

Re-lubricate as per LO 9-2320-273-12.

B. ADJUSTMENT (M916 and M920 ONLY).

NOTE

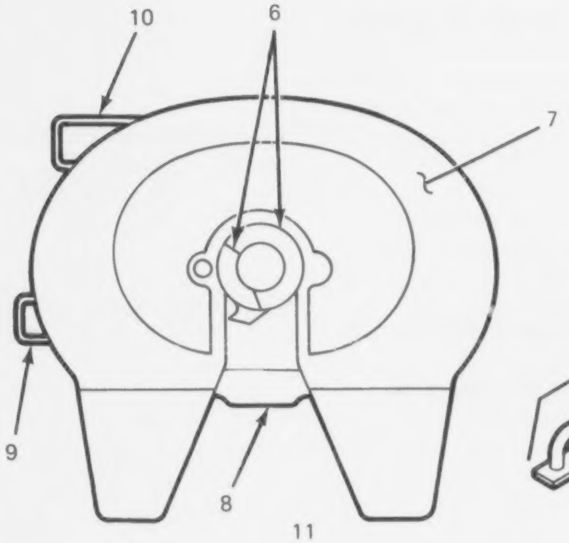
- Clean 5th wheel thoroughly before making adjustment.
- Use tool TLN 1500 in the following procedure.

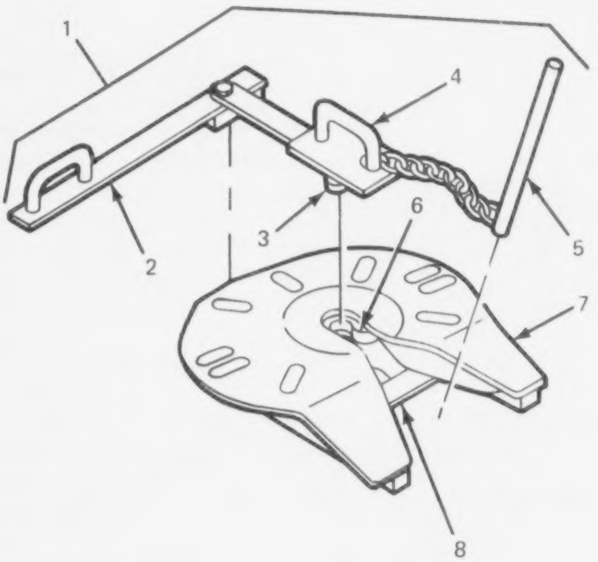
FRAME.

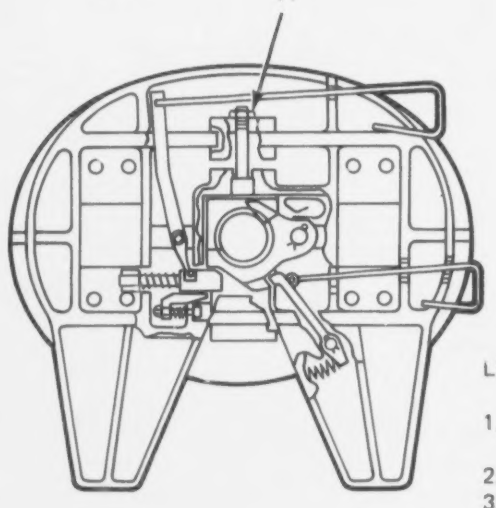
11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

B. ADJUSTMENT (M916 and M920 ONLY) (Continued).







LEGEND:

1. FIFTH WHEEL LOCK TESTER
2. LEVER
3. KING PIN
4. KING PIN PLATE
5. BAR
6. LOCK JAW (2)
7. FIFTH WHEEL PLATE ASSY
8. CROSS TIE
9. RELEASE HANDLE
10. SECONDARY LOCK HANDLE
11. HEXAGON HEAD NUT

TA 237249

11-13. FIFTH WHEEL MAINTENANCE (Continued).

B. ADJUSTMENT (M916 and M920 ONLY) (Continued).

NOTE

To install the fifth wheel lock tester, the fifth wheel lock jaws must be open. Do step 1 to open lock jaws, if necessary.

LOCATION/ITEM	ACTION	REMARKS
1. Secondary lock handle (10), release handle (9) and lock jaws (6).	a. Pull out secondary lock handle (10), until it catches on 5th wheel plate assembly (7). b. Pull out release handle (9), and pry open lock jaws (6).	
2. Fifth wheel lock tester (1).	a. Grasp handle of king pin plate (4) and place king pin (3) into lock jaws (6). b. Place lever (2) over front of 5th wheel plate assembly.	
	c. While pushing down on king pin plate (4), rotate lever (2) away from 5th wheel plate assembly (7) until king pin (3) is locked in lock jaws (6).	Be sure king pin plate (4) is flat against the 5th wheel plate assembly (7) during this operation.
	d. Position bar (5) over edge of cross tie (8).	
	e. Pry forward with lever (2) and rearward with bar (5) to check for play (1/8" (.31 cm) or less).	Do step 3 to adjust lock jaws (6), if necessary.
3. Hexagon head nut (11).	Tighten or loosen to obtain a snug fit against 5th wheel plate assembly (7).	If there is still play after adjusting lock jaws (6) refer to Direct Support and General Support Maintenance.
4. Fifth wheel lock tester (1).	a. Rotate lever (2) towards 5th wheel plate assembly (7). b. Position bar (5) on edge of cross tie (8), using leverage remove king pin (3) from lock jaws (6).	

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

B. ADJUSTMENT (M916 and M920 ONLY) (Continued).

NOTE

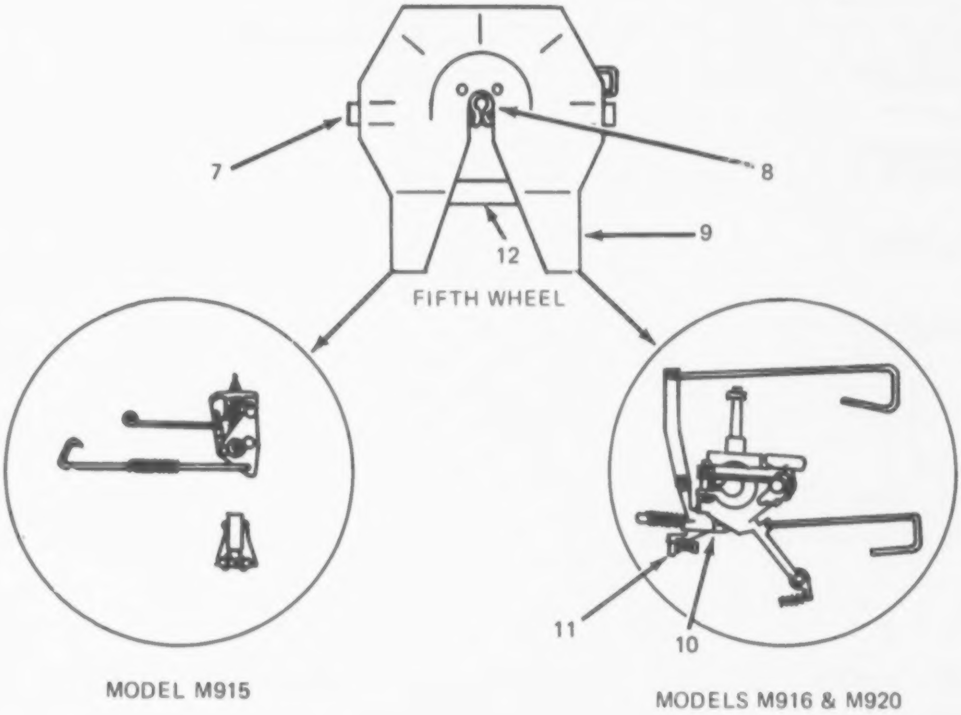
Repeat this procedure to verify proper adjustment of fifth wheel.

Follow-on maintenance action required:

Re-lubricate as per LO 9-2320-273-12.

11-13. FIFTH WHEEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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FIFTH WHEEL
MODEL M915
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10
MODELS M916 & M920

LEGEND:

7. LOCK
8. JAW
9. WHEEL PLATE SURFACE
10. CAPSCREW
11. SUPPORT PIN
12. FIFTH WHEEL CROSS BRACE

TA 075030

11-14. FENDER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Front Fender (M915).	(10)
b. Installation of Front Fender (M915).	(10)
c. Removal of Front Fender (M916 Thru M920).	(15)
d. Installation of Front Fender (M916 Thru M920).	(15)
e. Removal of Rear Fender.	(5)
f. Installation of Rear Fender.	(5)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
5-44A	If damaged Front Fenders are to be Removed: Headlamp Assembly Removed.
11-16E	Brush guard removed (M916 thru M920).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

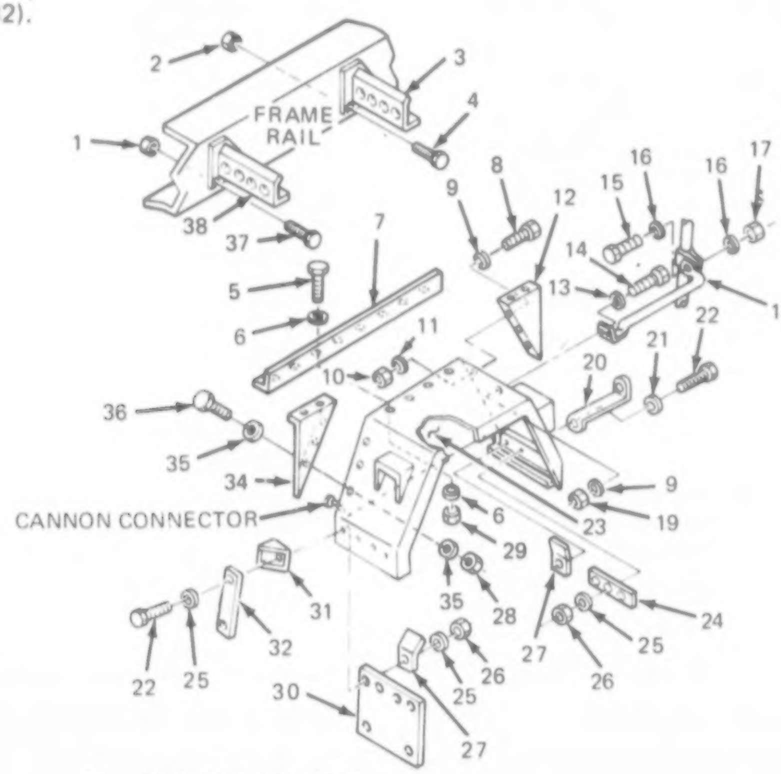
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission in Neutral.

11-14. FENDER MAINTENANCE (Continued).

A. REMOVAL OF FRONT FENDER (M915).

LOCATION/ITEM	ACTION	REMARKS
1. Unlatch hood.	Refer to TM 9-2320-273-10.	
2. Cannon connector.	Twist and remove from firewall connector.	
3. Ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	Remove.	Fender to bumper brace (20) and fender to cab support brace (31) may be removed from vehicle by unscrewing one existing nut.
4. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), and two anti-sail braces (32).	Remove from fender supports (3) and (38).	Second mechanic to assist.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CANNON CONNECTOR
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LEGEND

1. NUT (3)
2. NUT (3)
3. FENDER SUPPORT
4. BOLT (3)
5. BOLT (8)
6. WASHER (16)
7. TOP FILLER PANEL
8. BOLT (7)
9. WASHER (14)
10. WASHER (2)
11. NUT (2)
12. FORWARD FILLER PANEL
13. WASHER (2)
14. BOLT (2)
15. BOLT
16. WASHER (2)
17. NUT
18. BRUSH GUARD SUPPORT
19. NUT (7)
20. FENDER TO BUMPER BRACE
21. WASHER
22. BOLT (10)
23. SPLASH SHIELD
24. OUTER STIFFENER
25. WASHER (19)
26. NUT (10)
27. INNER STIFFENER (2)
28. NUT (6)
29. NUT (8)
30. MUD FLAP
31. FENDER TO CAB SUPPORT BRACE
32. ANTI SAIL BRACE (2)
33. FRONT FENDER
34. REAR FILLER PANEL
35. WASHER (12)
36. BOLT (6)
37. BOLT (3)
38. FENDER SUPPORT

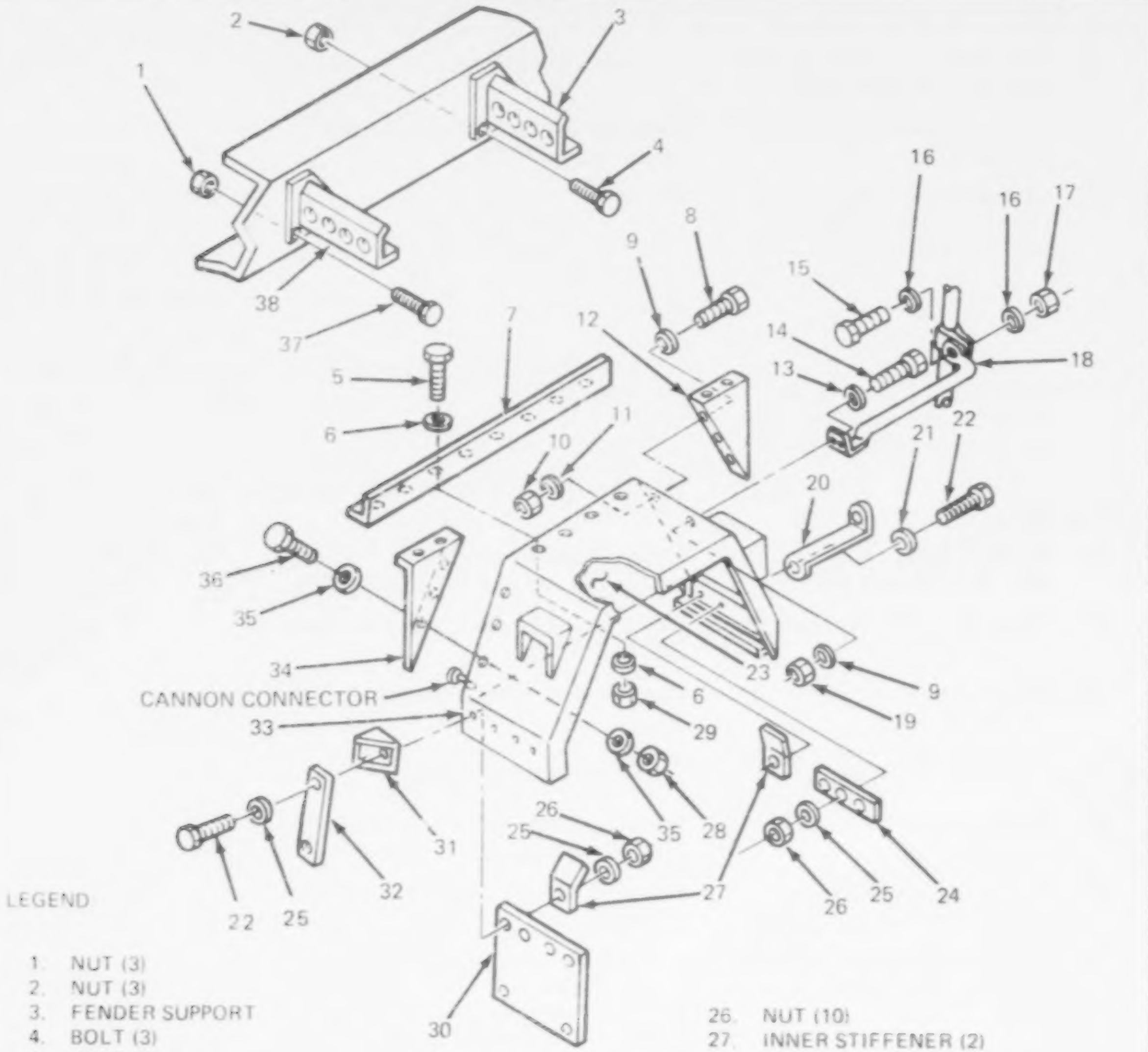
TA 075654

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF FRONT FENDER (M915) (Continued).		
5. Eight bolts (5), sixteen washers (6), and eight nuts (29).	Unscrew and remove top filler panel (7).	
6. Six bolts (36), twelve washers (35), and six nuts (28).	Unscrew and remove forward filler panel (12) and rear filler panel (34).	
7. Three bolts (37) and nuts (1).	Unscrew and remove fender support (38).	
8. Three bolts (4) and nuts (2).	Unscrew and remove fender support (3).	
B. INSTALLATION OF FRONT FENDER (M915).		
9. Fender support (3).	Install to frame rail with three bolts (4) and nuts (2).	
10. Fender support (38).	Install to frame rail with three bolts (37) and nuts (1).	
11. Forward filler panel (12) and rear filler panel (34).	a. Aline with mounting holes on fender (33). b. Attach with six bolts (36), twelve washers (35), and six nuts (28).	
12. Top filler panel (7).	a. Aline with mounting holes on fender (33), forward filler panel (12), and rear filler panel (34). b. Attach with eight bolts (5), sixteen washers (6), and eight nuts (29).	
13. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), two anti-sail braces (32), fender to bumper brace (20) and fender to cab support brace (31).	a. Aline with mounting holes on fender supports (3) and (38). b. Attach with ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	If braces (20) or (31) were removed from vehicle, reinstall with one existing nut.
14. Cannon connector.	Twist onto firewall connector.	
15. Latch hood.	Refer to TM 9-2320-273-10.	
C. REMOVAL OF FRONT FENDER (M916 thru M920).		
16. Unlatch hood.	Refer to TM 9-2320-273-10.	
17. Cannon connector.	Twist and remove from firewall connector.	

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



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CANNON CONNECTOR

LEGEND

1. NUT (3)
2. NUT (3)
3. FENDER SUPPORT
4. BOLT (3)
5. BOLT (8)
6. WASHER (16)
7. TOP FILLER PANEL
8. BOLT (7)
9. WASHER (14)
10. WASHER (2)
11. NUT (2)
12. FORWARD FILLER PANEL
13. WASHER (2)
14. BOLT (2)
15. BOLT
16. WASHER (2)
17. NUT
18. BRUSH GUARD SUPPORT
19. NUT (7)
20. FENDER TO BUMPER BRACE
21. WASHER
22. BOLT (10)
23. SPLASH SHIELD
24. OUTER STIFFENER
25. WASHER (19)
26. NUT (10)
27. INNER STIFFENER (2)
28. NUT (6)
29. NUT (8)
30. MUD FLAP
31. FENDER TO CAB SUPPORT BRACE
32. ANTI-SAIL BRACE (2)
33. FRONT FENDER
34. REAR FILLER PANEL
35. WASHER (12)
36. BOLT (6)
37. BOLT (3)
38. FENDER SUPPORT

TA 075655

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11-14. FENDER MAINTENANCE (Continued).

C. REMOVAL OF FRONT FENDER (M916 thru M920) (Continued).

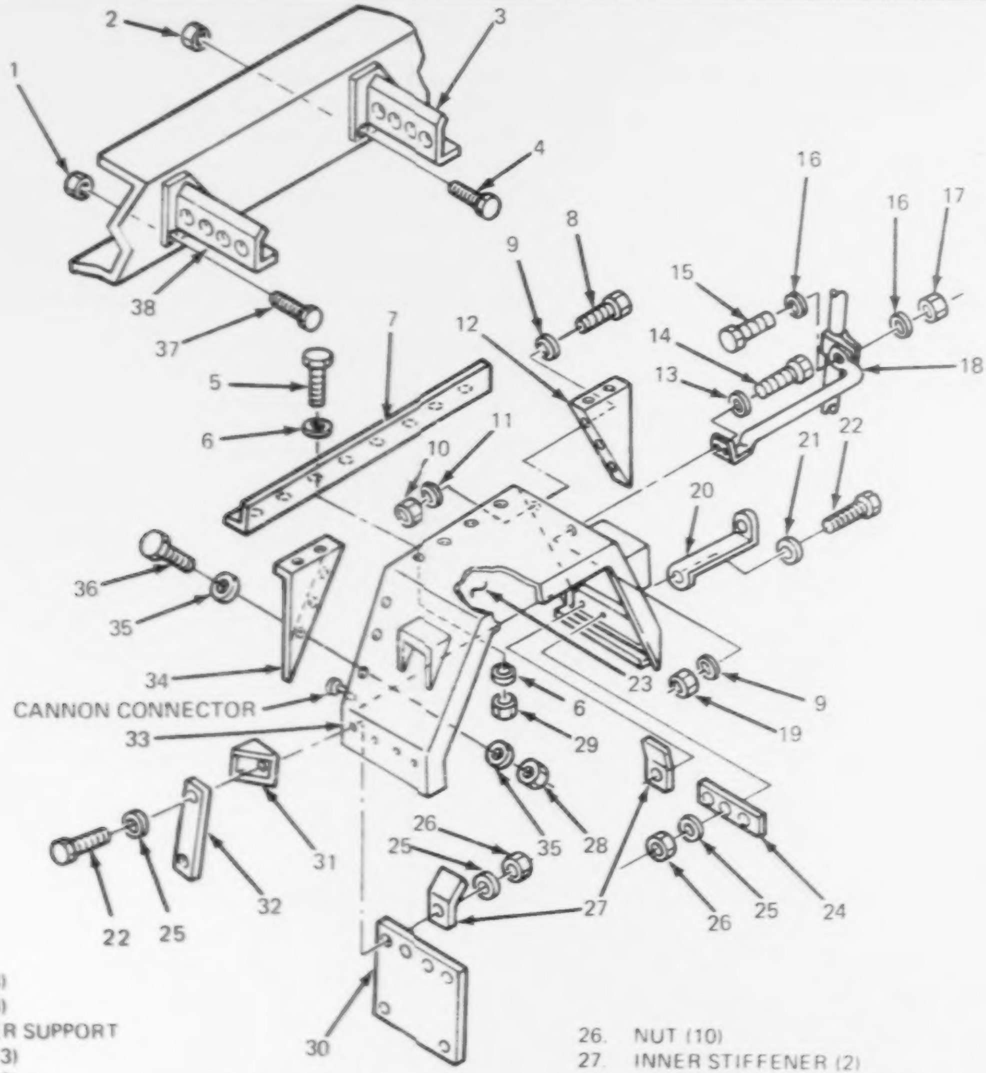
LOCATION/ITEM	ACTION	REMARKS
18. Two nuts (11), washers (10), washers (13), and bolts (14).	Unscrew and remove.	
19. Bolt (15), two washers (16) and nut (17).	Unscrew and remove with brush guard support (18).	
20. Ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	Remove.	Fender to bumper brace (20) and fender to cab support brace (31) may be removed from vehicle by unscrewing one existing nut.
21. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), and two anti-sail braces (32).	Remove from fender supports (3). and (38).	Second mechanic to assist.
22. Eight bolts (5), sixteen washers (6), and eight nuts (29).	Unscrew and remove top filler panel (7).	
23. Six bolts (36), twelve washers (35), and six nuts (28).	Unscrew and remove forward filler panel (12) and rear filler panel (34).	
24. Three bolts (37) and nuts (1).	Unscrew and remove fender support (38).	
25. Three bolts (4) and nuts (2).	Unscrew and remove fender support (3).	

D. INSTALLATION OF FRONT FENDER (M916 thru M920).

LOCATION/ITEM	ACTION	REMARKS
26. Fender support (3).	Install to frame rail with three bolts (4) and nuts (2).	
27. Fender support (38).	Install to frame rail with three bolts (37) and nuts (1).	
28. Forward filler panel (12) and rear filler panel (34).	a. Aline with mounting holes on fender (33). b. Attach with six bolts (36), twelve washers (35), and six nuts (28).	
29. Top filler panel (7).	a. Aline with mounting holes on fender (33), forward filler panel (12), and rear filler panel (34). b. Attach with eight bolts (5), sixteen washers (6), and eight nuts (29).	
30. Front fender (33), two inner stiffeners (27), one outer stiffener (24), mud flap (30), two anti-sail braces (32), fender to bumper brace (20) and fender to cab support brace (31).	a. Aline with mounting holes on fender supports (3) and (38). b. Attach with ten bolts (22), washer (21), nineteen washers (25) and ten nuts (26).	If braces (20) or (31) were removed from vehicle, reinstall with one existing nut.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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CANNON CONNECTOR
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LEGEND

1. NUT (3)
2. NUT (3)
3. FENDER SUPPORT
4. BOLT (3)
5. BOLT (8)
6. WASHER (16)
7. TOP FILLER PANEL
8. BOLT (7)
9. WASHER (14)
10. WASHER (2)
11. NUT (2)
12. FORWARD FILLER PANEL
13. WASHER (2)
14. BOLT (2)
15. BOLT
16. WASHER (2)
17. NUT
18. BRUSH GUARD SUPPORT
19. NUT (7)
20. FENDER TO BUMPER BRACE
21. WASHER
22. BOLT (10)
23. SPLASH SHIELD
24. OUTER STIFFENER
25. WASHER (19)
26. NUT (10)
27. INNER STIFFENER (2)
28. NUT (6)
29. NUT (8)
30. MUD FLAP
31. FENDER TO CAB SUPPORT BRACE
32. ANTI-SAIL BRACE (2)
33. FRONT FENDER
34. REAR FILLER PANEL
35. WASHER (12)
36. BOLT (6)
37. BOLT (3)
38. FENDER SUPPORT

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11-14. FENDER MAINTENANCE (Continued).

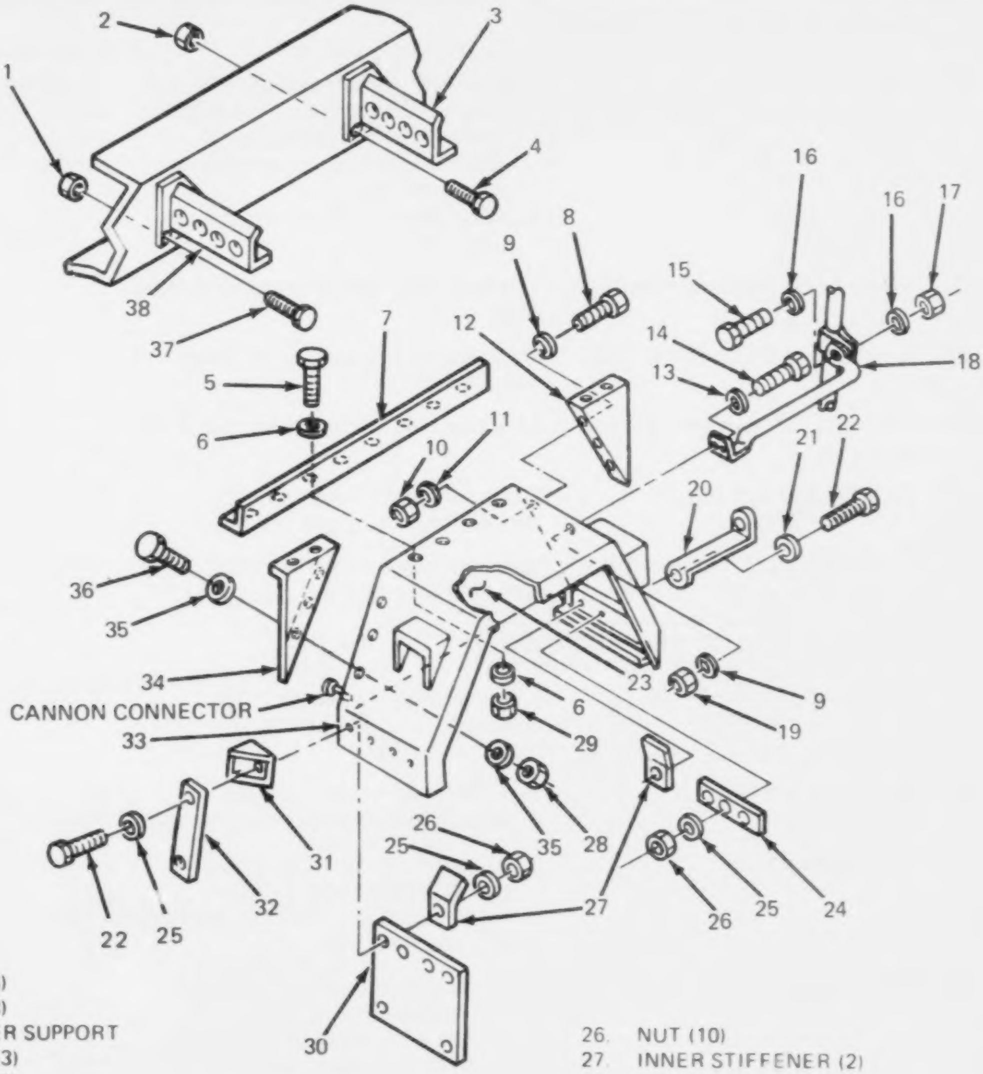
D. INSTALLATION OF FRONT FENDER (M916 thru M920) (Continued).

LOCATION/ITEM	ACTION	REMARKS
31. Brush guard support (18).	a. Aline mounting holes. b. Install to fender with two bolts (14), washers (10), washers (13), and nuts (11). c. Install to brush guard with bolt (15), two washers (16) and nut (17).	
32. Cannon connector.	Twist onto firewall connector.	
33. Latch hood.	Refer to TM 9-2320-273-10.	

BODY AND CAB.

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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CANNON CONNECTOR

LEGEND

1. NUT (3)
2. NUT (3)
3. FENDER SUPPORT
4. BOLT (3)
5. BOLT (8)
6. WASHER (16)
7. TOP FILLER PANEL
8. BOLT (7)
9. WASHER (14)
10. WASHER (2)
11. NUT (2)
12. FORWARD FILLER PANEL
13. WASHER (2)
14. BOLT (2)
15. BOLT
16. WASHER (2)
17. NUT
18. BRUSH GUARD SUPPORT
19. NUT (7)
20. FENDER TO BUMPER BRACE
21. WASHER
22. BOLT (10)
23. SPLASH SHIELD
24. OUTER STIFFENER
25. WASHER (19)
26. NUT (10)
27. INNER STIFFENER (2)
28. NUT (6)
29. NUT (8)
30. MUD FLAP
31. FENDER TO CAB SUPPORT BRACE
32. ANTI-SAIL BRACE (2)
33. FRONT FENDER
34. REAR FILLER PANEL
35. WASHER (12)
36. BOLT (6)
37. BOLT (3)
38. FENDER SUPPORT

TA 075657

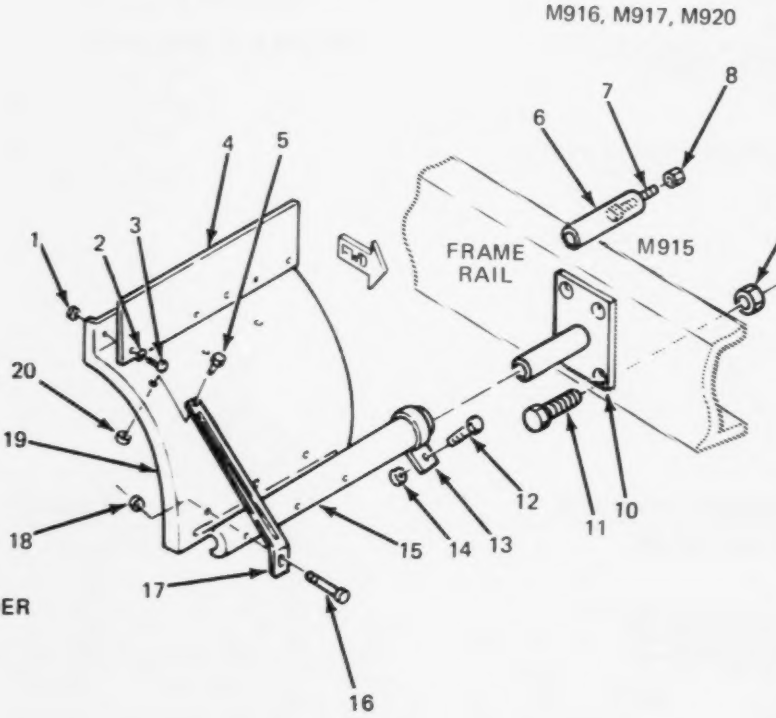
11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. REMOVAL OF REAR FENDER.		
34. Bolt (12) and nut (14).	a. Unscrew, loosen clamp (13), and slide mounting tube (15) with fender (19) attached, from mounting pin (6) or mounting pin plate (10). b. Slide clamp (13) off mounting tube (15).	Mounting pin (6) used on M916, M917, M920; mounting pin plate (10) used on M915.
35. Three bolts (16) and nuts (18).	Unscrew and remove mounting tube (15).	
36. Three bolts (5) and nuts (20).	Unscrew and remove with three supports (17).	
37. Six bolts (3), washers (2), and nuts (1).	Unscrew and remove mud guard (4).	
38. Bolt (7) and nut (6).	Unscrew from frame rail and remove mounting pin (6).	M916, M917, and M920 only.
39. Four bolts (11) and nuts (9).	Unscrew from frame rail and remove mounting pin plate (10).	M915 only.
F. INSTALLATION OF REAR FENDER.		
40. Mounting pin plate (10).	a. Aline with frame rail holes. b. Attach with four bolts (11) and nuts (9).	M915 only.
41. Mounting pin (6).	a. Aline with frame rail hole. b. Attach with bolt (7) and nut (8).	M916, M917, and M920 only.
42. Mud guard (4).	a. Aline with mounting at top of rear quarter fender (19). b. Attach with six bolts (3), washers (2), and nuts (1).	
43. Three supports (17).	a. Aline with mounting holes on rear quarter fender (19). b. Attach with three bolts (5) and nuts (20) at upper fender curvature.	
44. Mounting tube (15).	a. Aline with lower mounting holes on three supports (17) and rear quarter fender (19). b. Attach with three bolts (16) and nuts (18).	
45. Clamp (13).	Slide over mounting tube (15).	

11-14. FENDER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
F. INSTALLATION OF REAR FENDER (Continued).		
46. Mounting tube (15).	a. Slide over mounting pin (6) (M916, M917, and M920), or mounting pin plate (10) (M915). b. Secure with bolt (12) and nut (14) thru clamp (13).	

LEGEND:
1. NUT (6)
2. WASHER (6)
3. BOLT (6)
4. MUD GUARD
5. BOLT (3)
6. MOUNTING PIN
7. BOLT
8. NUT
9. NUT (4)
10. MOUNTING PIN PLATE
11. BOLT (4)
12. BOLT
13. CLAMP
14. NUT
15. MOUNTING TUBE
16. BOLT (3)
17. SUPPORT (3)
18. NUT (3)
19. REAR QUARTER FENDER
20. NUT (3)


M916, M917, M920
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FRAME RAIL
M915
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TA 075658

11-15. VENTILATOR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(10)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-26A.	Heater Removed.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES TM

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

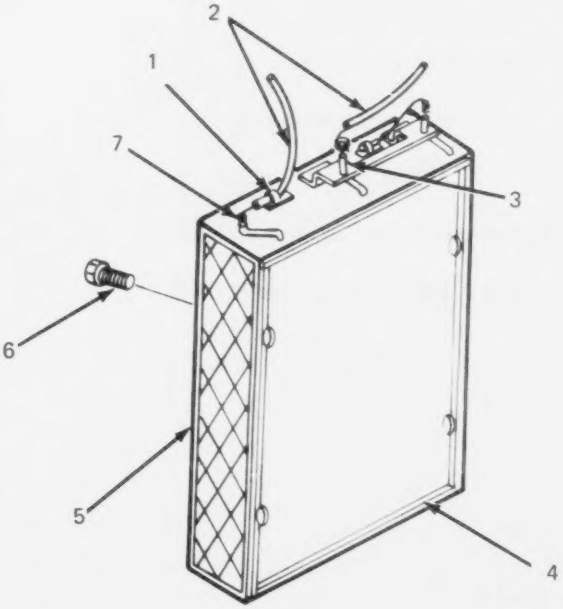
11-15. VENTILATOR MAINTENANCE (Continued).

NOTE

The driver's side ventilator is riveted into the side of the cab. It is not maintained at the Organizational level.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Two clips (1).	Loosen. Remove two cable wires (2) from clips.	
2. Two wire ends (7).	Slide off of two pins (3).	If necessary, tag for location.



LEGEND:

1. CLIP (2)
2. CABLE WIRE (2)
3. PIN (2)
4. SEAL
5. VENTILATOR
6. SCREW (4)
7. WIRE END (2)

TA 075032

11-15. VENTILATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Four screws (6)	Unscrew and remove.	
4. Ventilator (5).	Remove.	
5. Seal (4).	a. Inspect seal for deterioration. If necessary, remove using a suitable tool.	
	b. If seal is being replaced, cut seal to desired length and remove adhesive backing. Install seal on ventilator applying firm and even pressure.	
B. INSTALLATION.		
6. Ventilator (5).	Set in place.	
7. Four screws (6).	Screw in and tighten.	
8. Two wire ends (7).	Slide onto two pins (3).	
9. Two clips (1).	Fasten over cable wires (2).	

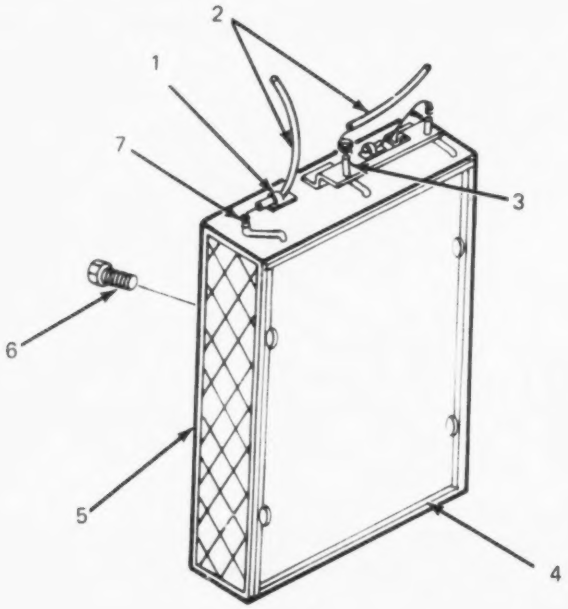
NOTE

Follow-on maintenance action required:

Install heater; refer to paragraph 11-24B.

11-15. VENTILATOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CLIP (2)
2. CABLE WIRE (2)
3. PIN (2)
4. SEAL
5. VENTILATOR
6. SCREW (4)
7. WIRE END (2)

TA 075663

11-16. GRILLE AND BRUSH GUARD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Disassembly.	(5)
c. Assembly.	(10)
d. Installation.	(10)
e. Brush Guard Removal.	(10)
f. Brush Guard Installation.	(10)
	55 Minutes Total

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES TM

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

A. REMOVAL.

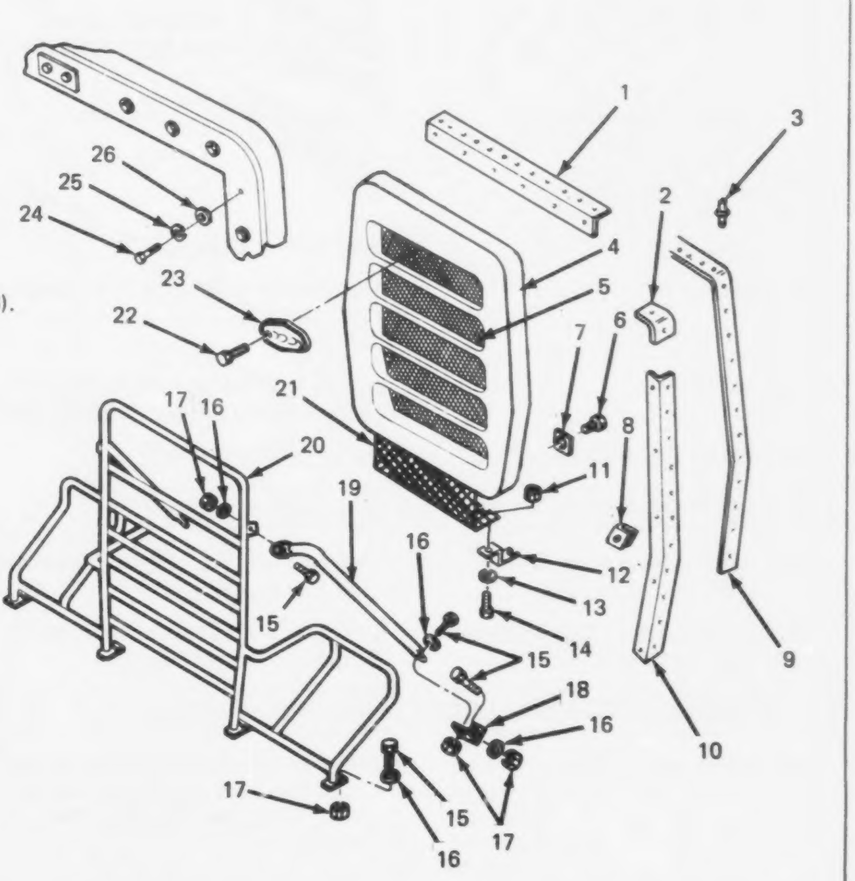
NOTE

On M916 thru M920, remove brush guard; refer to para 11-16E.

LOCATION/ITEM	ACTION	REMARKS
1. Sixteen capscrews (24), lockwashers (25) and washers (26).	Unscrew and remove grille (4).	
2. Two bolts (14), washers (13), nuts (11), and brackets (12).	Unscrew and remove screen (21).	Top of grille will need to be tipped forward to remove bolts (M916 thru M920).

LEGEND:

1. RAIL
2. FILLER (2)
3. RIVET
4. GRILLE
5. SCREEN
6. CAPSCREW (23)
7. PLATE (23)
8. STEEL SPRING NUT (16).
9. FILLER (2)
10. RAIL (2)
11. NUT (2)
12. BRACKET (2)
13. WASHER (2)
14. BOLT (2)
15. SCREW (16)
16. WASHER (16)
17. NUT (16)
18. BRACKET (2)
19. BRACE (2)
20. BRUSH GUARD
21. SCREEN
22. TAP SCREW (2)
23. PLATE
24. CAPSCREW (16)
25. LOCKWASHER (16)
26. WASHER (16).



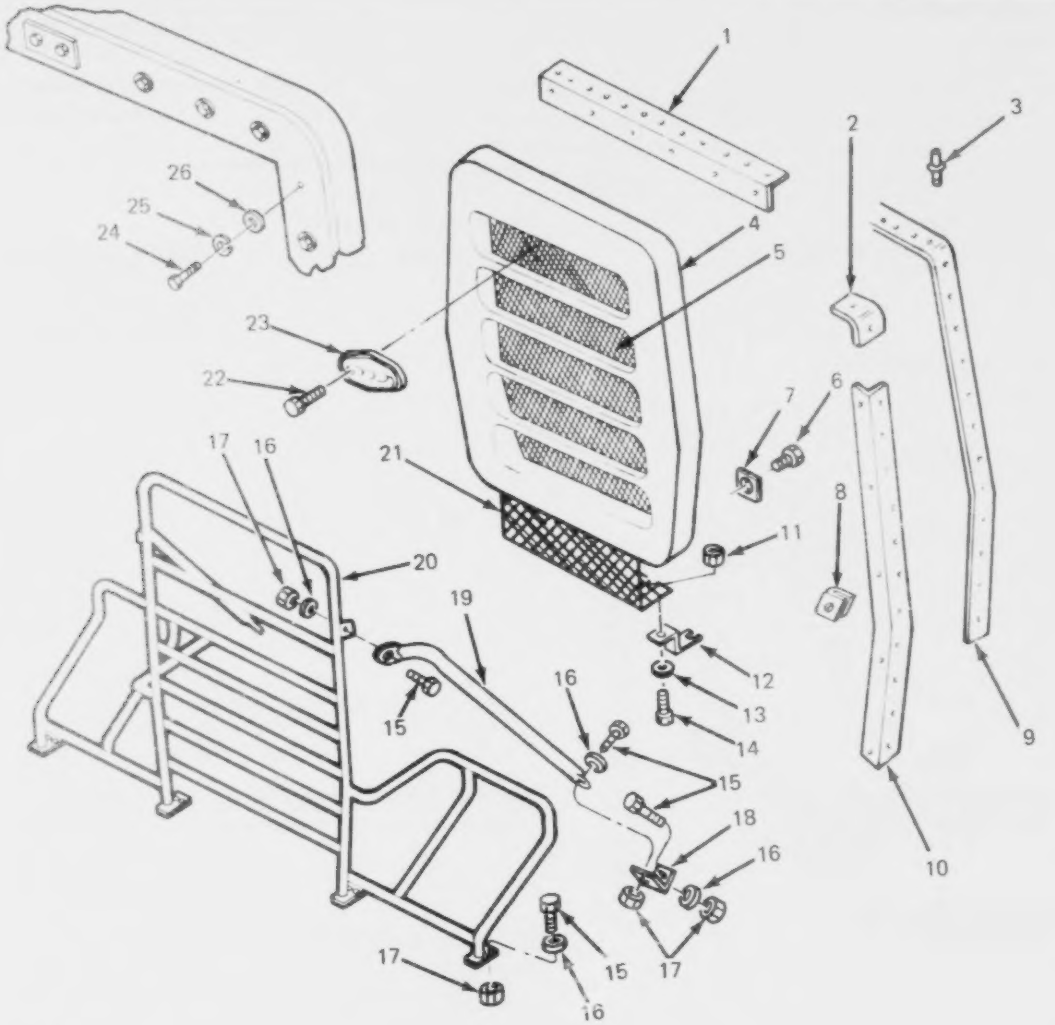
TA 075034

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. DISASSEMBLY.		
3. Rail (1), two fillers (2), two fillers (9), and two rails (10).	Drill out rivets (3) and remove.	It is not necessary to remove steel spring nuts (8) unless they are broken.
4. Twenty-three capscrews (6) and plates (7).	Unscrew and remove screen (5).	
5. Two tap screws (22) and plate (23).	Unscrew and remove.	
C. ASSEMBLY.		
6. Plate (23).	Fasten to grille (4) with two tap screws (22).	
7. Screen (5).	Aline with grille (4) and attach with twenty-three capscrews (6) and plates (7).	
8. Rail (1), two fillers (2), two fillers (9), and two rails (10).	Install to grille (4) with new rivets (3).	Replace any broken steel spring nuts (8) as needed.
D. INSTALLATION.		
9. Grille (4).	Position on truck.	
10. Screen (21).	Install with two bolts (14), washers (13), brackets (12), and nuts (11).	Top of grille must be tipped forward to install bolts (M916 thru M920).
11. Grille (4).	Install with sixteen capscrews (24), lockwashers (25) and washers (26).	
12. Install brush guard.	Refer to para 11-16F.	M916 thru M920 only.
E. BRUSH GUARD REMOVAL (M916 thru M920 only).		
13. Eight screws (15), washers (16), and nuts (17).	Unscrew and remove two brackets (18) and braces (19).	
14. Eight screws (15), washers (16), and nuts (17).	Unscrew and remove brush guard (20) from front bumper.	
F. BRUSH GUARD INSTALLATION (M916 thru M920 only).		
15. Brush guard (20).	Aline with mounting holes on top of bumper and secure with eight screws (15), washers (16), and nuts (17).	
16. Two braces (19) and brackets (18).	Aline with mounting holes at front fenders and brush guard (20) and secure with eight screws (15), washers (16), and nuts (17).	

11-16. GRILLE AND BRUSH GUARD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS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LEGEND:

1. RAIL
2. FILLER (2)
3. RIVET
4. GRILLE
5. SCREEN
6. CAPSCREW (23)
7. PLATE (23)
8. STEEL SPRING NUT (16).
9. FILLER (2)
10. RAIL (2)
11. NUT (2)
12. BRACKET (2)
13. WASHER (2)
14. BOLT (2)
15. SCREW (16)
16. WASHER (16)
17. NUT (16)
18. BRACKET (2)
19. BRACE (2)
20. BRUSH GUARD
21. SCREEN
22. TAP SCREW (2)
23. PLATE
24. CAPSCREW (16)
25. LOCKWASHER (16)
26. WASHER (16).

TA 075033

11-17. OPTIONAL WINTER FRONT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Original Installation.	(30)
b. Removal.	(15)
c. Installation	(15)
	30 minutes total.*

*Not including original installation.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
None.

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
11-16A.	Grille Removed.
11-16E.	Brush Guard Removed (M916 thru M920).

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine Off.
Transmission in Neutral.
Park Brake Set.

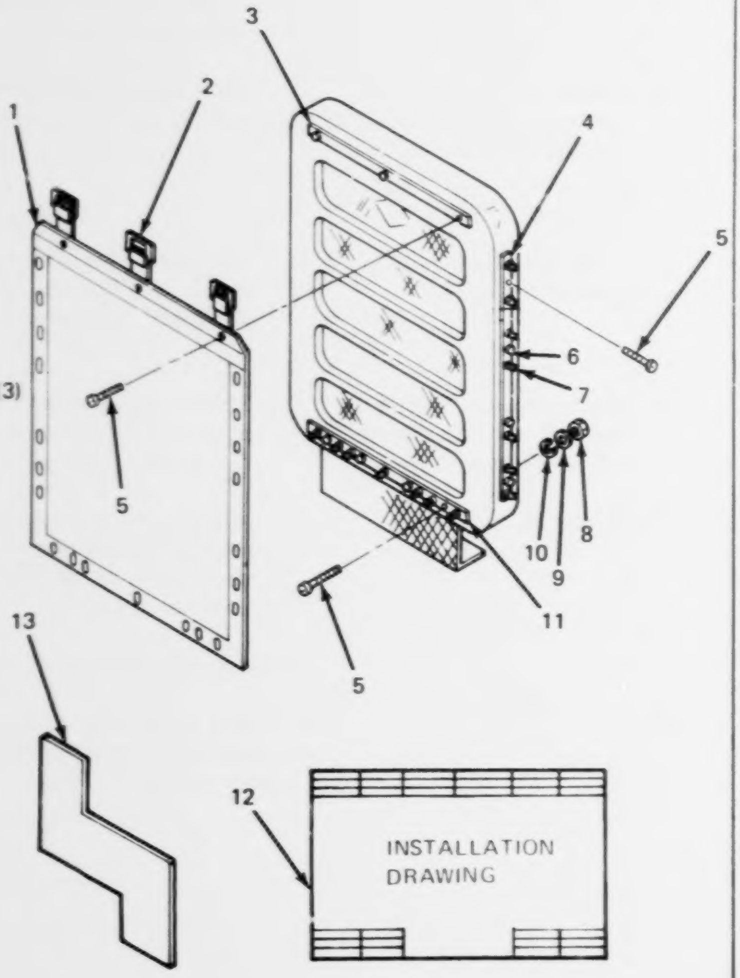
11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

A. ORIGINAL INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
1. Installation drawing (12) and template (13).	Follow the instructions contained within the installation drawing and use the template for proper drill locations on the grille.	An installation drawing and drill template is supplied with each Winter Front Kit.

LEGEND:

1. WINTER FRONT
2. STRAP AND BUCKLE ASSEMBLY (3)
3. TOP BAR ASSEMBLY
4. SIDE BAR ASSEMBLY (2)
5. SCREW (15)
6. LOCKWASHER (21)
7. TWIST LOCK (21)
8. NUT (15)
9. FLAT WASHER (15)
10. LOCKWASHER (15)
11. BOTTOM BAR ASSEMBLY
12. INSTALLATION DRAWING
13. TEMPLATE



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11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

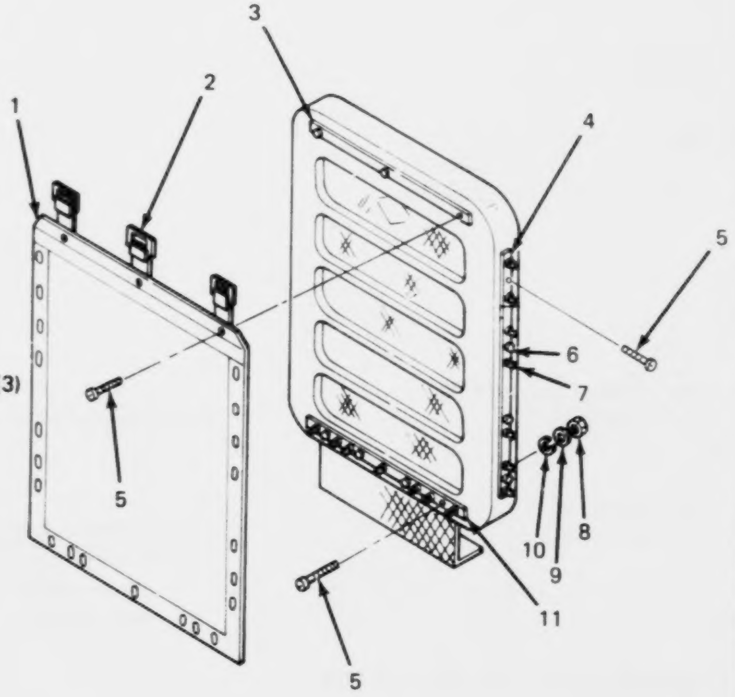
LOCATION/ITEM	ACTION	REMARKS
B. REMOVAL.		
2. Three screws (5), lockwashers (10), flat washers (9), and nuts (8).	Unscrew and remove top bar assembly (3) along with three strap and buckle assemblies (2).	
3. Twenty-one twist locks (7) and lockwashers (6).	a. Turn to unlock and remove winter front (1).	
	b. Unscrew from two side bar assemblies (4) and bottom bar assembly (11).	
4. Twelve screws (5), lockwashers (10), flat washers (9) and nuts (8).	Unscrew and remove two side bars (4) and bottom bar (11).	
C. INSTALLATION.		
5. Two side bars (4) and bottom bar (11).	Attach to grille with twelve screws (5), lockwashers (10), flat washers (9), and nuts (8).	Twist locks (7) and lockwashers (6) are replaced only with bottom bar (11) and side bars (4).
6. Winter front (1), three strap and buckle assemblies (2), and top bar (3).	Fasten to grille with three screws (5), lockwashers (10), flat washers (9) and nuts (8).	
7. Winter front (1).	Adjust grille coverage for weather conditions with strap and buckle assemblies (2) and twist locks (7).	

Follow on Maintenance Action required:

a. Install grille; refer to para 11-16D.
b. Install brush guard (M916 thru M920); refer to para 11-16F.

11-17. OPTIONAL WINTER FRONT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. WINTER FRONT
2. STRAP AND BUCKLE ASSEMBLY (3)
3. TOP BAR ASSEMBLY
4. SIDE BAR ASSEMBLY (2)
5. SCREW (15)
6. LOCKWASHER (21)
7. TWIST LOCK (21)
8. NUT (15)
9. FLAT WASHER (15)
10. LOCKWASHER (15)
11. BOTTOM BAR ASSEMBLY

TA 075660

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal. (15)
b. Installation. (15)
30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS
All.

TEST EQUIPMENT
None.

SPECIAL TOOLS
None.

MATERIALS/PARTS (P/N)
Rivet (10) SSLQ-66 (05693).
Rivet (30) SSLQ-64 (05693).

PERSONNEL REQUIRED
Two (MOS-63B20).

REFERENCES (TM)
TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES
None.

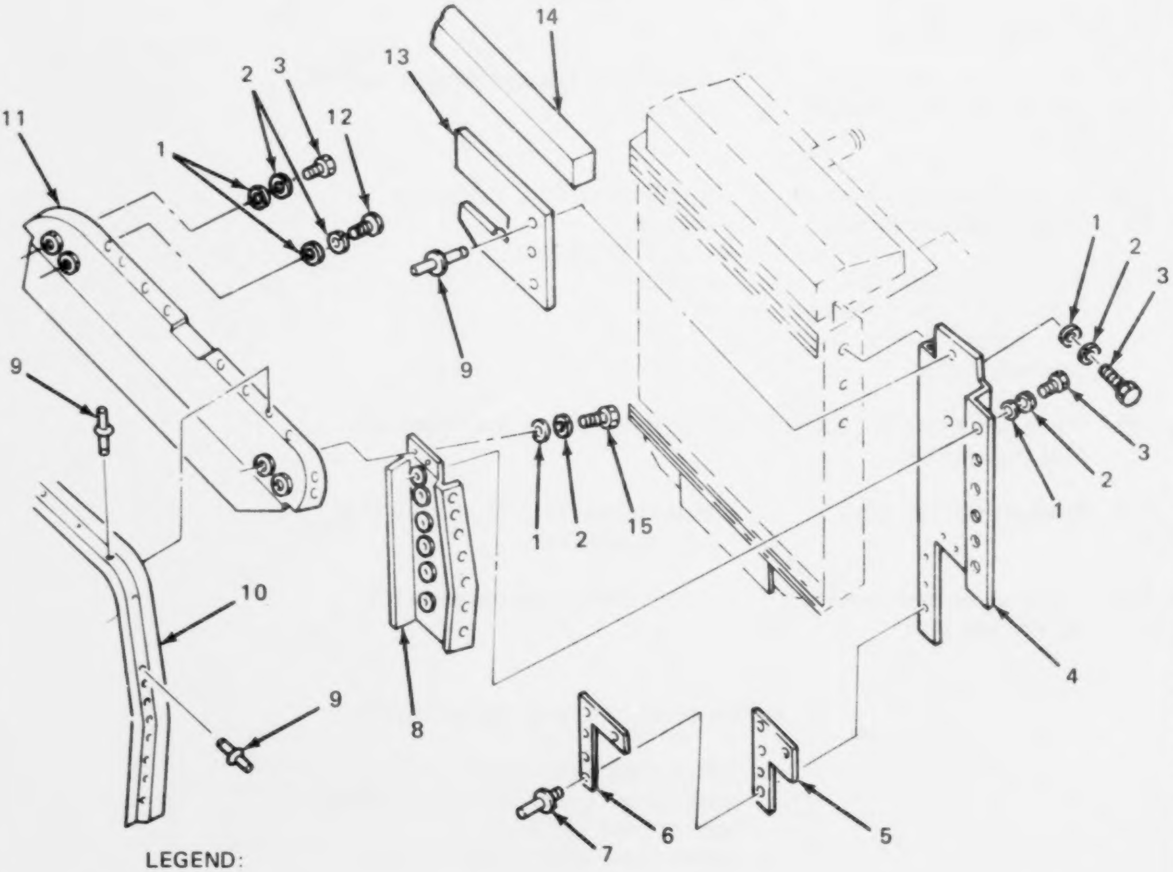
EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-16E.	Brush Guard Removed (M916 thru M920).
11-16A.	Grille Removed.
11-29A.	Hood Removed.

SPECIAL ENVIRONMENTAL CONDITIONS
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS
Engine Off.
Transmission In Neutral.
Park Brake Set.

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Thirty rivets (9) and seal (10).	Drill out rivets (9) and remove seal (10).	
2. Bolt (15), six capscrews (3), lockwashers (2) and washers (1).	Remove bracket (8) from bracket (4).	
3. Three rivets (9).	Drill out and remove baffle (13) and seal (14).	



LEGEND:

1. WASHER (12)
2. LOCKWASHER (12)
3. CAPSCREW (12)
4. BRACKET (2)
5. SHIELD (2)
6. RETAINER (2)
7. RIVET (10)
8. BRACKET (2)
9. RIVET (30)
10. SEAL
11. BRACKET
12. CAPSCREW
13. BAFFLE (2)
14. SEAL
15. BOLT

TA 075661

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

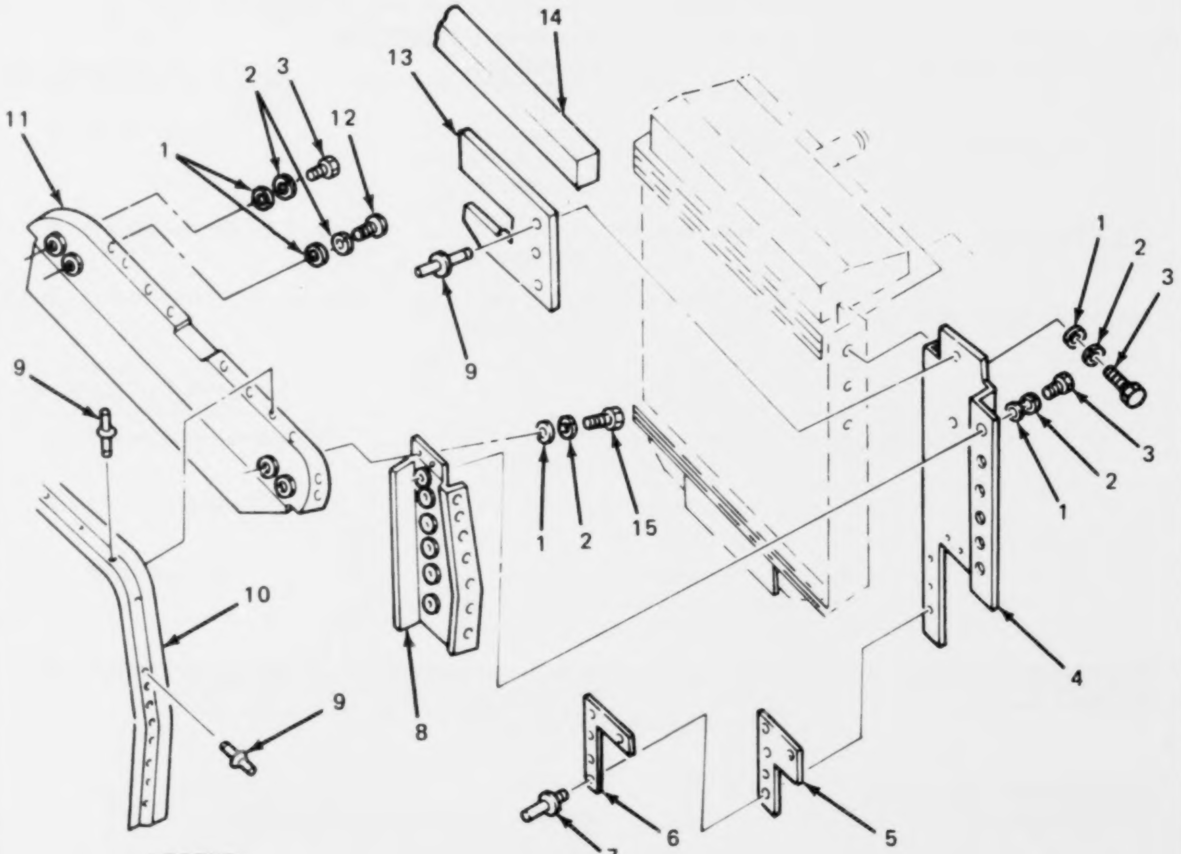
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Six capscrews (3), lockwashers (2) and washers (1).	Unscrew and remove bracket (4).	
5. Five rivets (7), retainer (6), and shield (5).	Drill out rivets (7) to remove shield (5) and retainer (6).	
6. Bracket (11).	Repeat steps (2), (3), (4), and (5) on opposite side and remove bracket (11).	
B. INSTALLATION.		
7. Bracket (4), shield (5), retainer (6), and five new rivets (7).	Install onto bracket (4) with new rivets (7).	
8. Six capscrews (3), washers (1) and lockwasher (2).	Install bracket (4) to radiator support.	
9. Bracket (8), bolt (16), bracket (11), six capscrews (3), washer (1), and lockwasher (2).	Install.	
10. Three new rivets (9), baffle (13) and seal (14).	Install and secure with rivets (9).	
11. Brackets (4) and (5).	Repeat steps (7), (8), (9) and (10) for opposite side.	
12. Thirty-seven new rivets (9) and seal (10).	Install rivets to secure seal (10).	

Follow on Maintenance Action required:

a. Install grille; refer to para 11-16D.
b. Install brush guard (M916 thru M920); refer to para 11-16F.
c. Install hood; refer to para 11-29B.

11-18. GRILLE SUPPORT BRACKETS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


14
13
2
3
11
12
1
9
1
2
3
9
3
2
1
1
2
15
10
4
9
8
6
7
5

LEGEND:

1. WASHER (12)
2. LOCKWASHER (12)
3. CAPSCREW (12)
4. BRACKET (2)
5. SHIELD (2)
6. RETAINER (2)
7. RIVET (10)
8. BRACKET (2)
9. RIVET (30)
10. SEAL
11. BRACKET
12. CAPSCREW
13. BAFFLE (2)
14. SEAL
15. BOLT

TA 075662

11-19. MUD FLAPS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(10)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M915, M916, M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

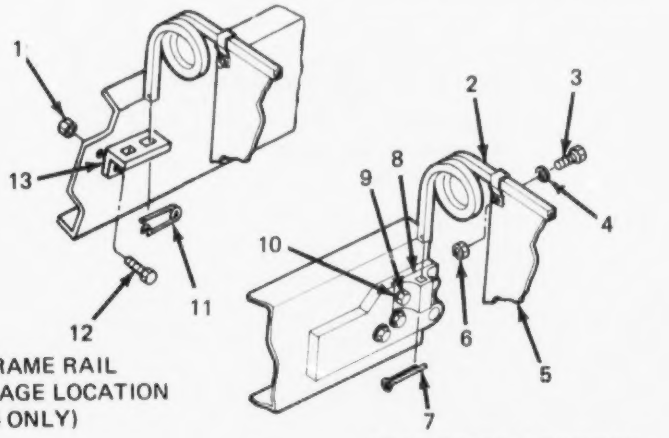
Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-19. MUD FLAPS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
NOTE Procedure is same for removal of either flap.		
A. REMOVAL.		
1. Spring pin (11) (M915) or cotter pin (7) (M916, and M920).	Remove from spring bracket (2).	
2. Spring bracket (2).	Lift out of mounting bracket (8).	
3. Mud flap (5).	Remove from spring bracket (2) by removing four bolts (3), washers (4) and four nuts (6).	
4. Two bolts (9) and washers (10).	Unscrew and remove mounting bracket (8).	
5. Two bolts (12) and nuts (1).	Unscrew and remove stowage bracket (13).	M915 only.
B. INSTALLATION.		
6. Stowage bracket (13).	Attach to RH frame rail with two bolts (12) and nuts (1).	M915 only.
7. Mounting bracket (8).	Attach to rear frame with two washers (10) and bolts (9).	
8. Mud flap (5)	Install mud flap onto spring bracket (2) and secure with four bolts (3), washers (4) and four nuts (6).	
9. Spring bracket (2).	Insert into mounting bracket (8) and install spring pin (11) (M915) or cotter pin (7) (M916 and M920).	



RH FRAME RAIL STOWAGE LOCATION (M915 ONLY)

REAR FRAME LOCATION

LEGEND:

1. NUT (2)
2. SPRING BRACKET
3. BOLT (4)
4. WASHER (4)
5. MUD FLAP
6. NUT (4)
7. COTTER PIN
8. MOUNTING BRACKET
9. BOLT (2)
10. WASHER (2)
11. SPRING PIN
12. BOLT (2)
13. STOWAGE BRACKET

TA 075036

11-20. DRIVERS SEAT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Cleaning and Lubricating Hardware.	(5)
c. Installation.	(6)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Grease Gun.
GAA (Refer to Appendix C).
Lubriplate (Refer to Appendix C).
Non-Flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

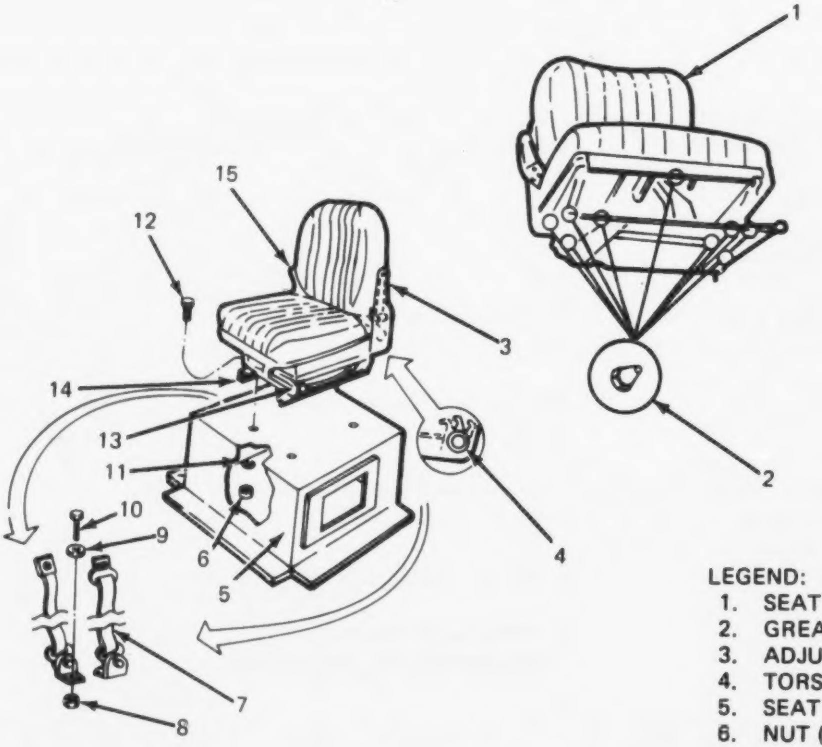
Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Four nuts (6), washers (11), and bolts (12).	Unscrew and remove.	
2. Seat (1).	Lift out and remove from seat base (5).	Two mechanics.
3. Two bolts (10), lockwashers (9), and nuts (8).	Unscrew and remove seat belt assembly (7).	



LEGEND:
1. SEAT
2. GREASE FITTING (9)
3. ADJUSTING MECHANISM
4. TORSION BAR END
5. SEAT BASE
6. NUT (4)
7. SEAT BELT ASSEMBLY
8. NUT (2)
9. LOCKWASHER (2)
10. BOLT (2)
11. WASHER (4)
12. BOLT (4)
13. ADJUSTING MECHANISM
14. SLIDE RAILS
15. ADJUSTING MECHANISM

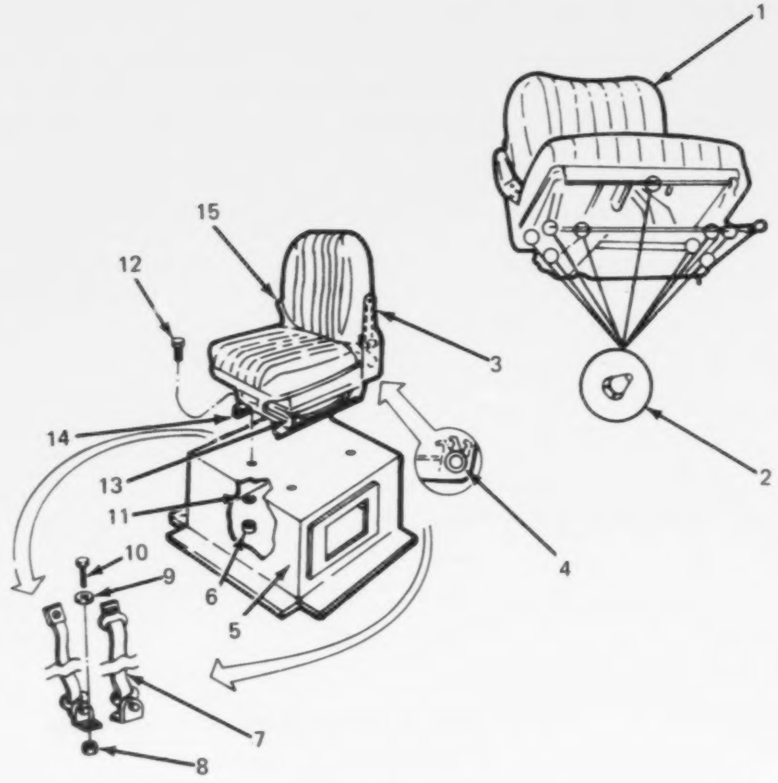
TA 075037

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. CLEANING AND LUBRICATING HARDWARE.		
	CAUTION Do not allow dry cleaning solvents to come in contact with non-metal materials. These cleaners may damage leather, rubber, and synthetics.	
4. Slide rails (14) and other metal parts.	Clean with SD-2 dry cleaning solvent.	
5. Grease fittings (2).	Lubricate, using grease gun.	See LO 9-2320-273-12.
6. Two torsion bar ends (4), three adjusting mechanisms (3), (13), and (15), and slide rails (14).	Lubricate liberally with Lubriplate.	
C. INSTALLATION.		
7. Adjusting mechanisms (3), (13), and (15).	Move to center positions.	
8. Seat (1).	Set in place and aline mounting holes.	
9. Four washers (11), bolts (12), and nuts (6).	Screw on and tighten to secure seat (1) to seat base (5).	
10. Seat belt assembly (7).	a. Aline mounting holes. b. Install with two bolts (10), lockwashers (9), and nuts (8).	

11-20. DRIVERS SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:
1. SEAT
2. GREASE FITTING (9)
3. ADJUSTING MECHANISM
4. TORSION BAR END
5. SEAT BASE
6. NUT (4)
7. SEAT BELT ASSEMBLY
8. NUT (2)
9. LOCKWASHER (2)
10. BOLT (2)
11. WASHER (4)
12. BOLT (4)
13. ADJUSTING MECHANISM
14. SLIDE RAILS
15. ADJUSTING MECHANISM

TA 075038

11-21. PASSENGER'S SEAT MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Cleaning and Lubricating Adjusting Mechanism.	(5)
c. Installation.	(7)
	17 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Lubriplate (Refer to Appendix C).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

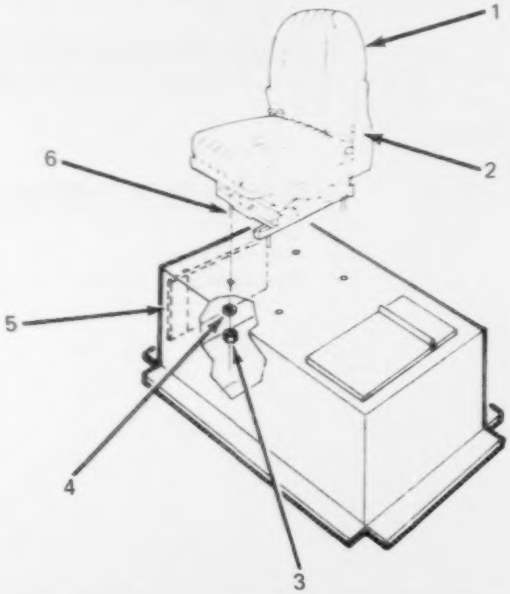
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

BODY AND CAB.

11-21. PASSENGER'S SEAT MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Tool box door (5).	Open for access to nuts (3) and washers (4).	Remove tools if necessary.
2. Four nuts (3) and washers (4).	Unscrew and remove.	
3. Seat (1).	Lift out and remove.	
B. CLEANING AND LUBRICATING ADJUSTING MECHANISM.		
4. Adjusting rack and tooth mechanism (2).	a. Clean with soap and water. Dry thoroughly. b. Apply Lubriplate to both sides.	
C. INSTALLATION.		
5. Seat (1).	a. Place back in position. b. Set in place with studs (6) in holes.	
6. Four washers (4) and nuts (3).	Screw on and tighten.	
7. Tool box door (5).	Close.	Put tools back in if you took them out.



LEGEND:

1. SEAT
2. ADJUSTING RACK & TOOTH MECHANISM
3. NUT (4)
4. WASHER (4)
5. TOOL BOX DOOR
6. STUD (4)

TA 075039

11-22. SEAT RISER AND TOOL BOX MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(45)
b. Installation.	(45)
	90 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-20A.	Drivers Seat Removed (for Seat Riser Removal).
11-21A.	Passenger's Seat Removed (For Tool Box Removal).

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission In Neutral.

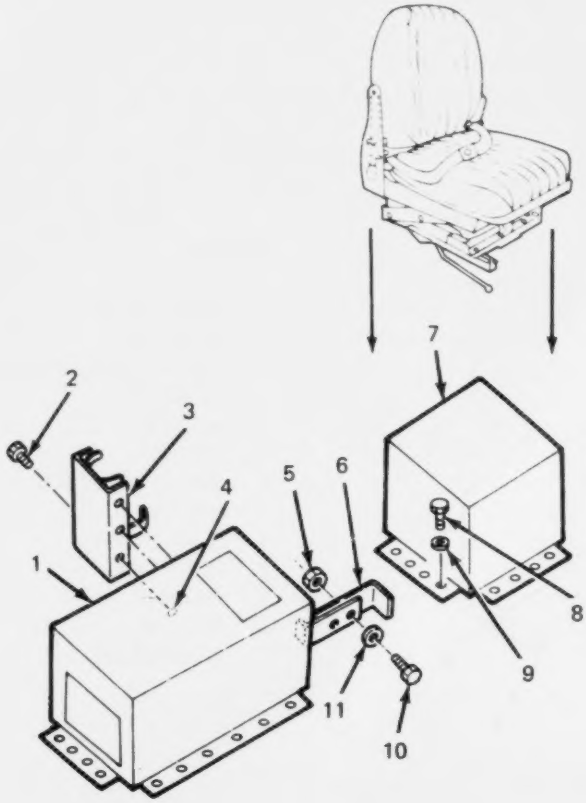
11-22. SEAT RISER AND TOOL BOX MAINTENANCE (Continued).

NOTE

Instructions for repairing metal tool box and seat riser may be found in FM 43-2.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Three bolts (2) and nuts (4).	Unscrew and remove fire extinguisher bracket (3).	
2. Four bolts (10), nuts (5), and eight washers (11).	Unscrew and remove two piece ratio selector brace (6).	
3. Thirty-six bolts (8), washers (9).	Unscrew and remove.	Total fasteners for both riser and tool box.
4. Seat riser (7) and tool box (1).	Remove	



LEGEND:

1. TOOL BOX
2. BOLT (3)
3. FIRE EXTINGUISHER BRACKET
4. NUT (3)
5. NUT (4)
6. RATIO SELECTOR BRACE (2)
7. SEAT RISER
8. BOLT (36)
9. WASHER (36)
10. BOLT (4)
11. WASHER (8)

TA 075040

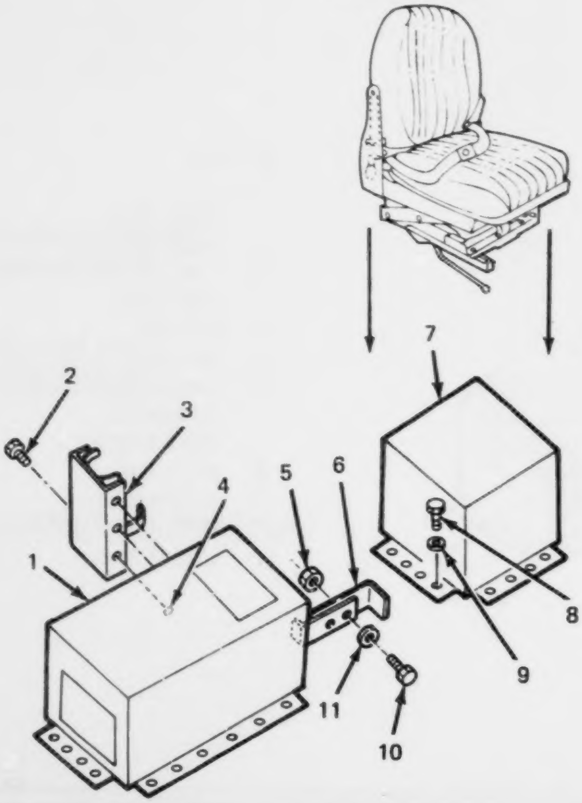
11-22. SEAT RISER AND TOOL BOX MAINTENANCE (Continued).

B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
5. Seat riser (7) and tool box (1).	Place in cab. Aline with bolt holes in cab floor.	
6. Thirty-six bolts (8) and washers (9).	Screw in and tighten.	
7. Ratio selector brace (6).	Install with four bolts (10), nuts (5), and eight washers (11).	
8. Fire extinguisher bracket (3).	Install with three bolts (2) and nuts (4).	

Follow-on maintenance actions required.

a. Install driver's seat; refer to para 11-20 C.
b. Install passenger's seat; refer to para 11-21 C.



LEGEND:

1. TOOL BOX
2. BOLT (3)
3. FIRE EXTINGUISHER BRACKET
4. NUT (3)
5. NUT (4)
6. RATIO SELECTOR BRACE (2)
7. SEAT RISER
8. BOLT (36)
9. WASHER (36)
10. BOLT (4)
11. WASHER (8)

TA 075041

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11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Installation.	(3)
c. Operational Check.	(1)
	8 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

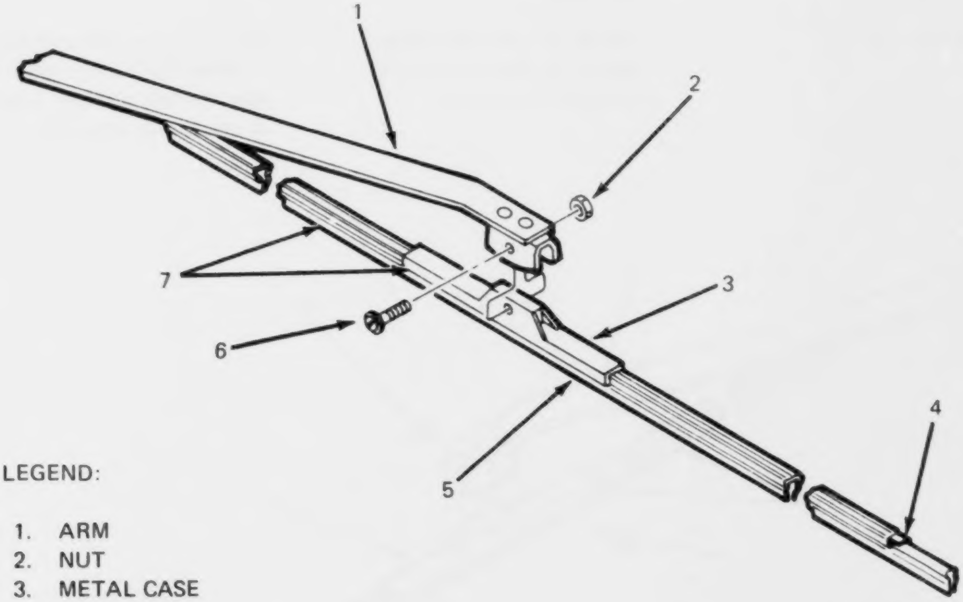
Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (6) and nut (2).	Unscrew and remove.	
2. Wiper blade assembly (7).	Remove from arm (1).	
3. Locking tab (4)	Pry up.	
4. Rubber blade (5).	Slide out of metal case (3).	



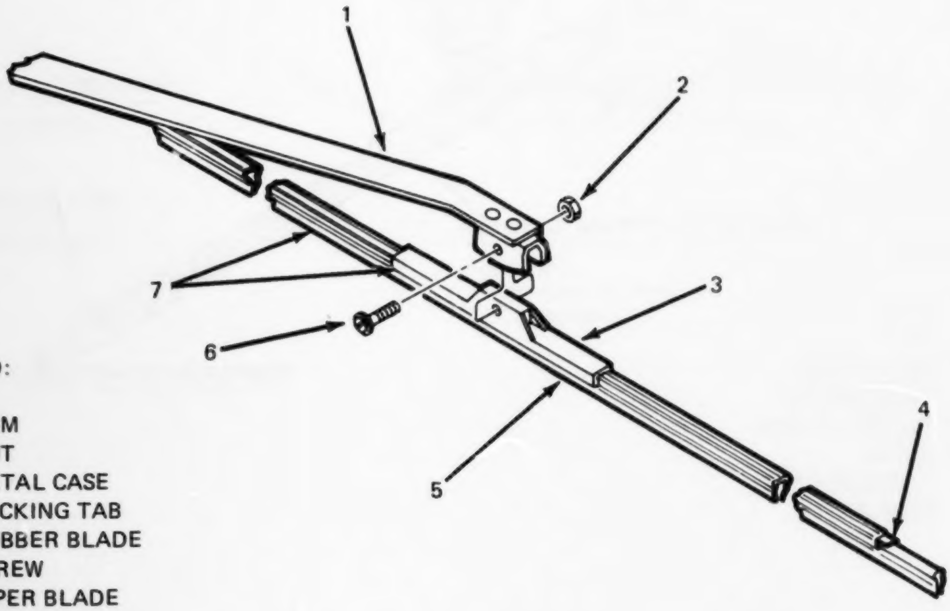
LEGEND:

1. ARM
2. NUT
3. METAL CASE
4. LOCKING TAB
5. RUBBER BLADE
6. SCREW
7. WIPER BLADE ASSEMBLY

TA 075042

11-23. WINDSHIELD WIPER BLADE AND ASSEMBLY MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
5. Rubber blade (5).	Slide into metal case (3).	
6. Locking tab (4).	Push down over rubber blade (5).	
7. Blade assembly (7).	Aline with arm (1).	
8. Screw (6) and nut (2).	a. Put screw through arm (1) and blade assembly (7). b. Screw nut on and tighten.	
C. OPERATIONAL CHECK.		
9. Wiper knob.	Pull out.	
10. Wiper blade (5).	Check to see that blade moves across windshield with good contact.	Squirting windshield with washer fluid will make it easy to tell if wiper blade is operating properly.



LEGEND:

1. ARM
2. NUT
3. METAL CASE
4. LOCKING TAB
5. RUBBER BLADE
6. SCREW
7. WIPER BLADE ASSEMBLY

TA 075043

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11-24. WINDSHIELD WIPER ARMS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(4)
b. Installation.	(3)
c. Operational Check.	(1)
	8 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 9-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

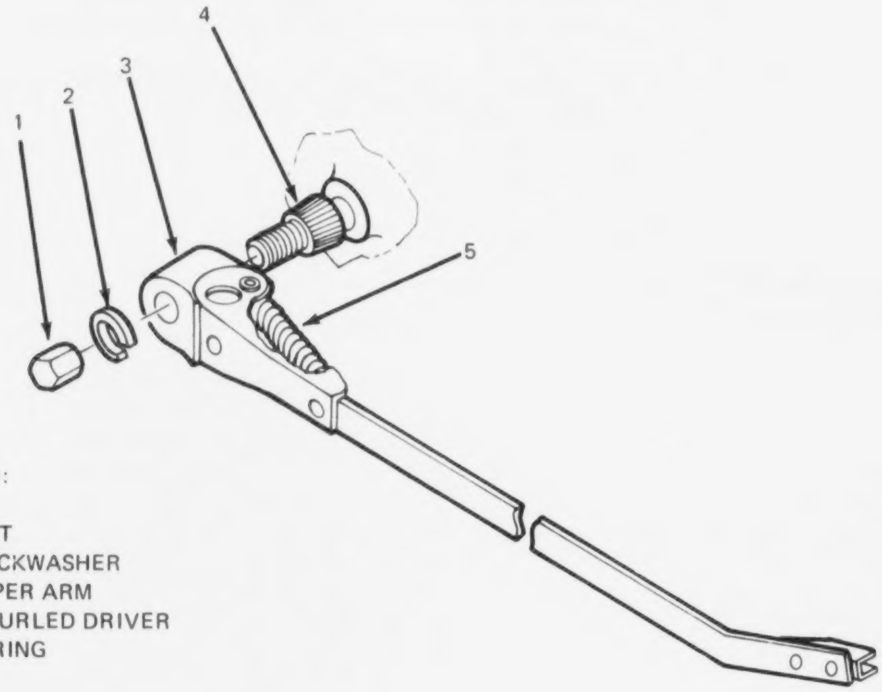
11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Nut (1) and lockwasher (2).	Unscrew and remove.	
2. Wiper arm (3).	Lift off of knurled driver (4).	
3. Spring (5).	Unhook and remove.	If spring is stretched so that it does not hold arm tightly, replace.

NOTE

Procedures for removing and installing blade are given in para 11-23.



LEGEND:

1. NUT
2. LOCKWASHER
3. WIPER ARM
4. KNURLED DRIVER
5. SPRING

TA 075044

11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION.		
4. Spring (5).	Lock into place.	Arm should be in same position as when you removed it.
5. Arm (3).	Seat firmly on knurled driver (4).	
6. Lockwasher (2) and nut (1).	Screw on and tighten.	
C. OPERATIONAL CHECK.		

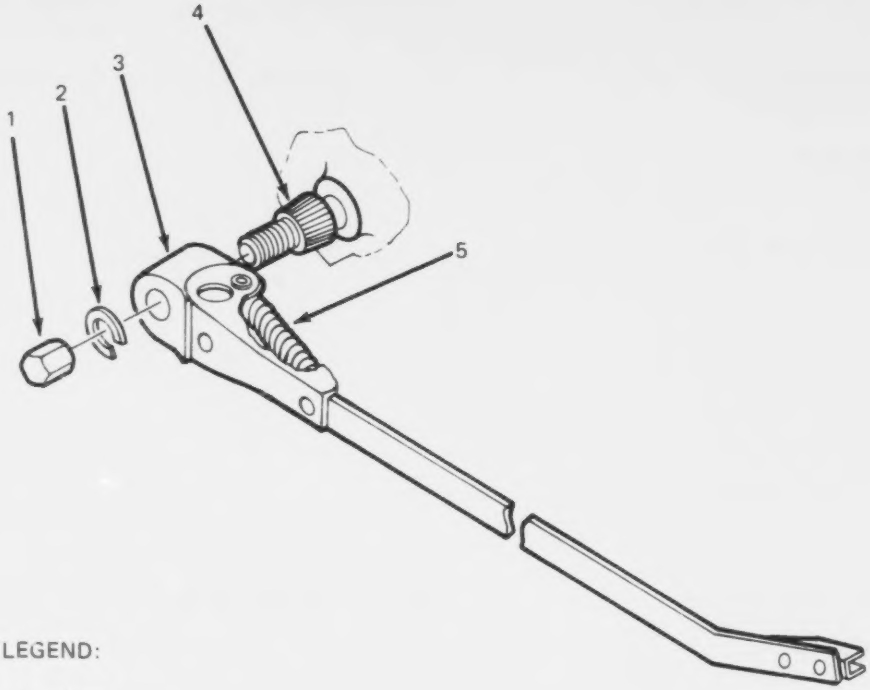
NOTE

Operate wipers to see that they move normally. Squirt windshield with washer fluid and check that it is removed without streaking. Park wipers.

If wipers do not operate correctly, troubleshoot wiper system as described in Table 9-1.

11-24. WINDSHIELD WIPER ARMS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. NUT
2. LOCKWASHER
3. WIPER ARM
4. KNURLED DRIVER
5. SPRING

TA 075045

11-25. REAR VIEW MIRROR MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Disassembly.	(15)
c. Assembly.	(15)
d. Installation.	(10)
e. Adjustment.	(10)
	60 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

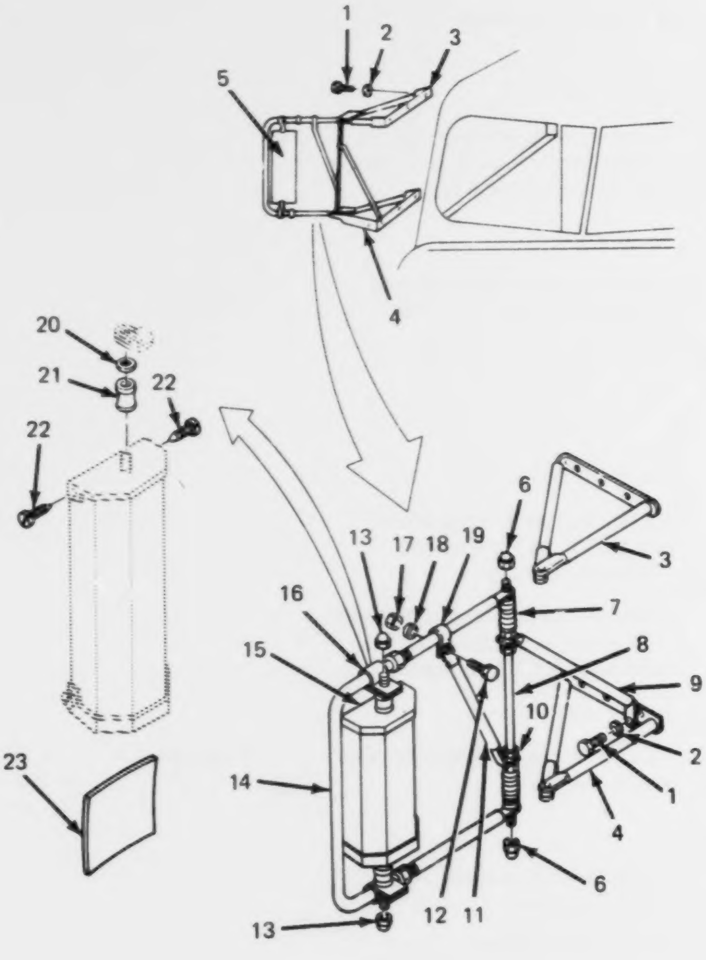
11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

NOTE

Procedure shown is for right side mirror.
Identical procedure is used for left side mirror.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Six bolts (1) and lockwashers (2).	Loosen and remove.	
2. Mirror assembly (5).	Remove.	



LEGEND:

1. BOLT (6)
2. LOCKWASHER (6)
3. BRACKET (UPPER)
4. BRACKET (LOWER)
5. MIRROR ASSEMBLY
6. ACORN NUT (2)
7. COMPRESSION SPRING (2)
8. PIVOT ROD
9. CROSS BRACE BRACKET
10. JAM NUT (4)
11. LOOP CROSS BRACE
12. CAPSCREW
13. ACORN NUT (2)
14. LOOP DETENT ASSEMBLY
15. MIRROR HEAD ASSEMBLY
16. TUBE CLAMP (2)
17. ACORN NUT
18. LOCKWASHER
19. TUBE CLAMP
20. LOCKWASHER (2)
21. SPACER (2)
22. SCREW (4)
23. MIRROR ASSEMBLY (2) (PRESSURE SENSITIVE)

TA 075046

11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

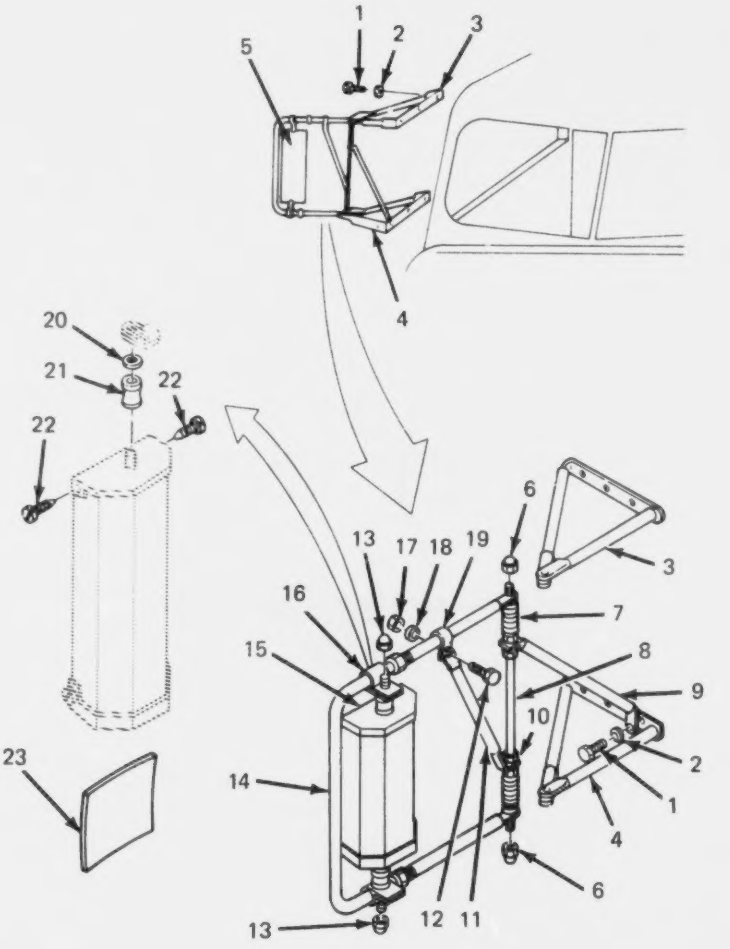
LOCATION/ITEM	ACTION	REMARKS
B. DISASSEMBLY.		
3. Two acorn nuts (13).	Loosen and remove.	
4. Two tube clamps (16), two lockwashers (20) and spacers (21).	Remove.	
5. Mirror assembly (23).	Pull free from face of mirror head assembly (15).	If damaged.
6. Capscrew (12), acorn nut (17) and lockwasher (18).	Loosen and remove.	
7. Two acorn nuts (6).	Loosen and remove.	
8. Loop detent assembly (14). bracket (upper) (3), bracket (lower) (4) and two compression springs (7).	Remove from pivot rod (8).	
9. Cross brace bracket (9) and loop cross brace (11).	Remove by unthreading two outer jam nuts (10) and removing from pivot rod (8).	
C. ASSEMBLY.		
10. Cross brace bracket (9) and loop cross brace (11).	Install on pivot rod (8) and secure with jam nuts (10).	
11. Two compression springs (7), loop detent assembly (14), bracket (upper) (3) and bracket (lower) (4).	Install on pivot rod (8).	
12. Two acorn nuts (6).	Install and tighten.	
13. Capscrew (12), acorn nut (17), and lockwasher (18).	Install to fasten loop cross brace (11) to tube clamp (19) and tighten.	
14. Two tube clamps (16).	Position mirror head assembly (15) and pivot tube clamps over screws (22) to secure.	
15. Two acorn nuts (13).	Install and tighten.	
16. Mirror assembly (23).	Stick onto face of mirror head assembly (15).	If removed.
D. INSTALLATION.		
17. Mirror assembly (5).	Position on door and aline mounting holes.	
18. Six bolts (1) and lockwashers (2).	Install and tighten.	

11-25. REAR VIEW MIRROR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
E. ADJUSTMENT.		
19. Mirror head assembly (15).	Adjust for best view.	

NOTE

If hauling extra wide loads, loosen two nuts on loop detent assembly (14). Mirrors can be telescoped an additional five inches.



LEGEND:

1. BOLT (6)
2. LOCKWASHER (6)
3. BRACKET (UPPER)
4. BRACKET (LOWER)
5. MIRROR ASSEMBLY
6. ACORN NUT (2)
7. COMPRESSION SPRING (2)
8. PIVOT ROD
9. CROSS BRACE BRACKET
10. JAM NUT (4)
11. LOOP CROSS BRACE
12. CAPSCREW
13. ACORN NUT (2)
14. LOOP DETENT ASSEMBLY
15. MIRROR HEAD ASSEMBLY
16. TUBE CLAMP (2)
17. ACORN NUT
18. LOCKWASHER
19. TUBE CLAMP
20. LOCKWASHER (2)
21. SPACER (2)
22. SCREW (4)
23. MIRROR ASSEMBLY (2) (PRESSURE SENSITIVE)

TA 075047

11-26. HEATER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(27)
b. Installation.	(55)
	82 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Electrical Tape.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
4-25A.	Air Cleaner Cannister Removed.
4-42A.	Radiator Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

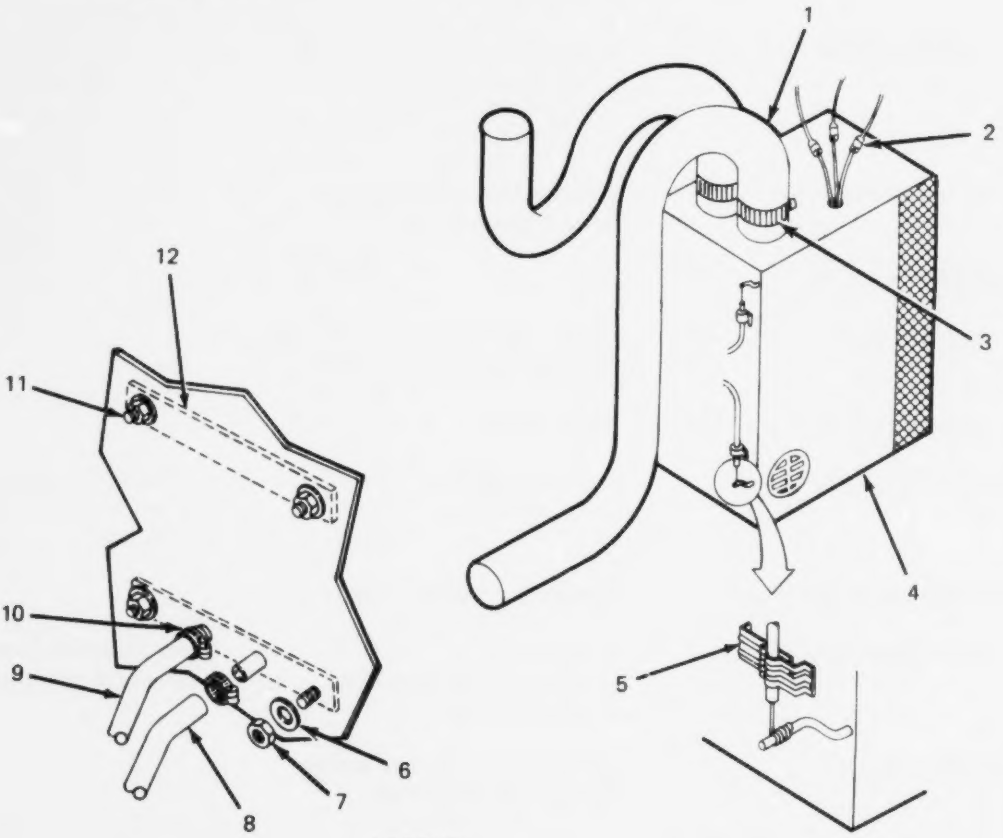
GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-26. HEATER MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. ENGINE COMPARTMENT/ Heater hoses (8) and (9).	a. Loosen two clamps (10). b. Disconnect hoses.	Keep hose ends raised to prevent coolant from running out.
2. ENGINE COMPARTMENT/ Four nuts (7) and washers (6).	Loosen and remove.	



LEGEND:

1. AIR DUCT (2)
2. WIRE (3)
3. CLAMP (2)
4. HEATER
5. CABLE CLIP (2)
6. WASHER (4)
7. NUT (4)
8. HEATER HOSE
9. HEATER HOSE
10. CLAMP (2)
11. HEATER MOUNTING STUD (4)
12. INSULATOR (2)

TA 075049

11-26 HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. CAB/Three wires (2).	Remove electrical tape and disconnect wires.	
4. CAB/Two air ducts (1).	a. Loosen clamps (3). b. Remove ducts.	
5. CAB/Two cable clips (5).	a. Loosen. b. Remove cables.	
6. CAB/Heater (4).	a. Remove eight screws from runner and slide floor mat out of way of heater. b. Remove.	
7. Two insulators (12).	Remove from four heater mounting studs (11).	
B. INSTALLATION.		
8. Two insulators (12).	Install over four heater mounting studs (11).	
9. CAB/Heater (4).	Set in place.	
10. CAB/Two cable clips (5).	a. Attach cables. b. Tighten clips.	PASSENGER cable goes to bottom, DRIVER cable goes to top.
11. CAB/Two air ducts (1).	Attach and tighten clamps (3).	
12. CAB/Three wires (2).	a. Connect. b. Wrap connections with electrical tape.	Wires are color-coded to help you match them up.
13. Floor mat.	Install eight screws to secure runner over floor mat.	
14. ENGINE COMPARTMENT/ four nuts (7) and washers (6).	Install and tighten.	
15. ENGINE COMPARTMENT/ Heater hoses (8) and (9).	a. Install hoses. b. Secure with two clamps (10).	

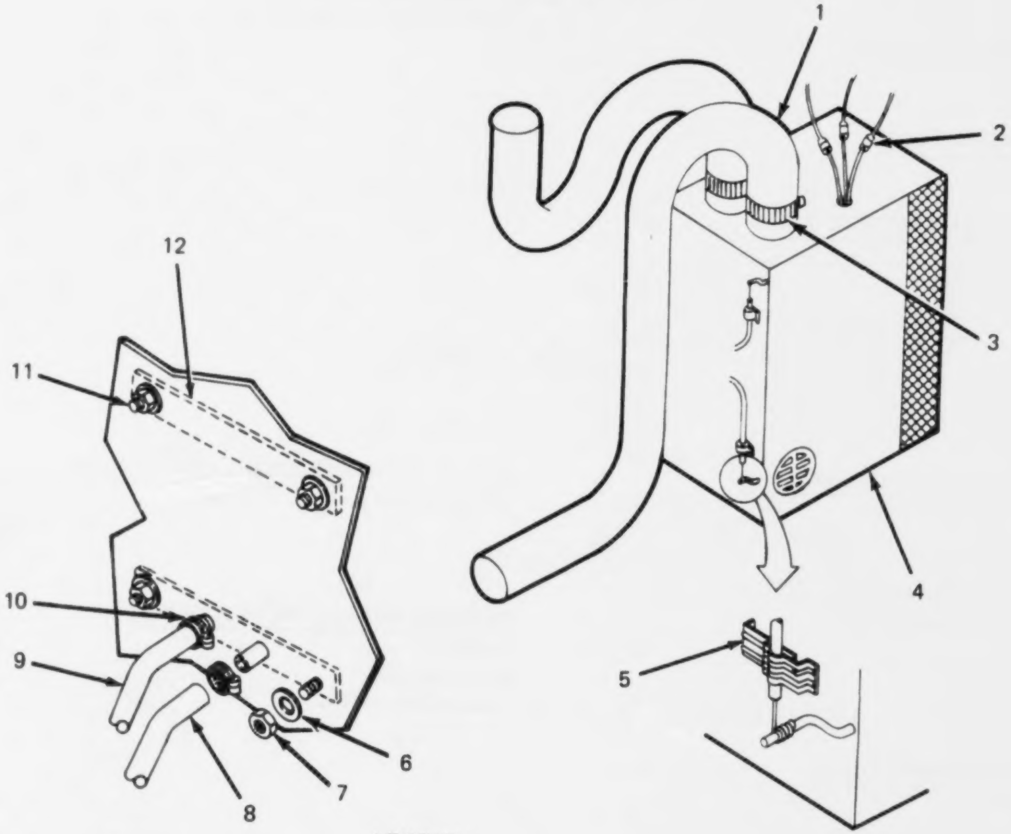
11-26 HEATER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

Follow-on Maintenance Action required:

a. Fill cooling system; refer to para 4-42C and D.
b. Install air cleaner cannister; refer to para 4-25D.
c. Bleed heater; refer to para 4-50C.



LEGEND:

1. AIR DUCT (2)
2. WIRE (3)
3. CLAMP (2)
4. HEATER
5. CABLE CLIP (2)
6. WASHER (4)
7. NUT (4)
8. HEATER HOSE
9. HEATER HOSE
10. CLAMP (2)
11. HEATER MOUNTING STUD (4)
12. INSULATOR (2)

TA 075048

11-27. HEATER HOSE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All

TEST EQUIPMENT

None

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
4-42a.	Radiator Drained.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Park Brake Set.
Transmission In Neutral.

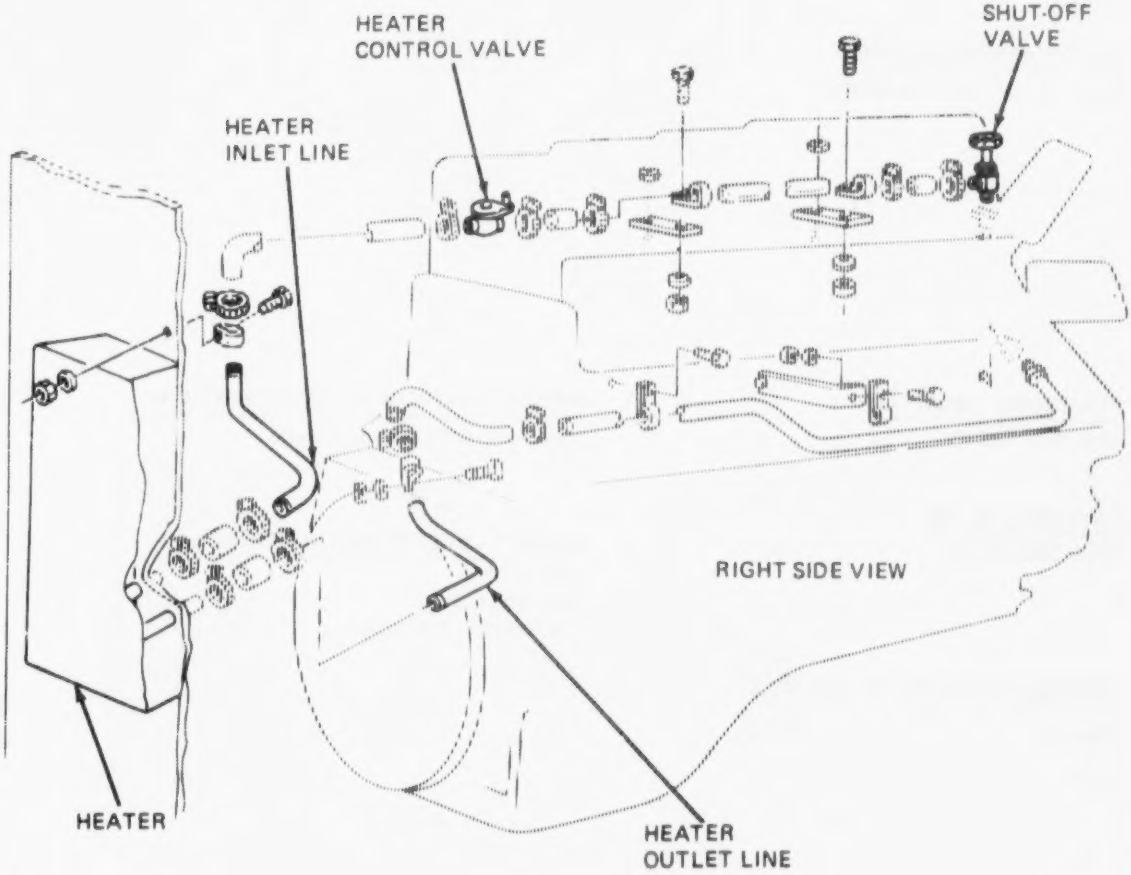
11-27. HEATER HOSE MAINTENANCE (Continued).

NOTE

All heater hoses and clamps are maintained using standard shop practices and techniques. Replace hoses that are cracked or deteriorated and any defective clamps.

Follow on maintenance action required:

a. Fill cooling system; refer to para 4-42 C and D.
b. Bleed heater; refer to para 4-50C.
c. Check for leaks.


HEATER CONTROL VALVE
SHUT-OFF VALVE
HEATER INLET LINE
RIGHT SIDE VIEW
HEATER
HEATER OUTLET LINE

TA 075698

11-28. HEATER CONTROL PANEL MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal of Knob and Cable.	(5)
b. Installation of Knob and Cable.	(10)
c. Operational Check.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cable tie, MS-3367-1-9 (96906)

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

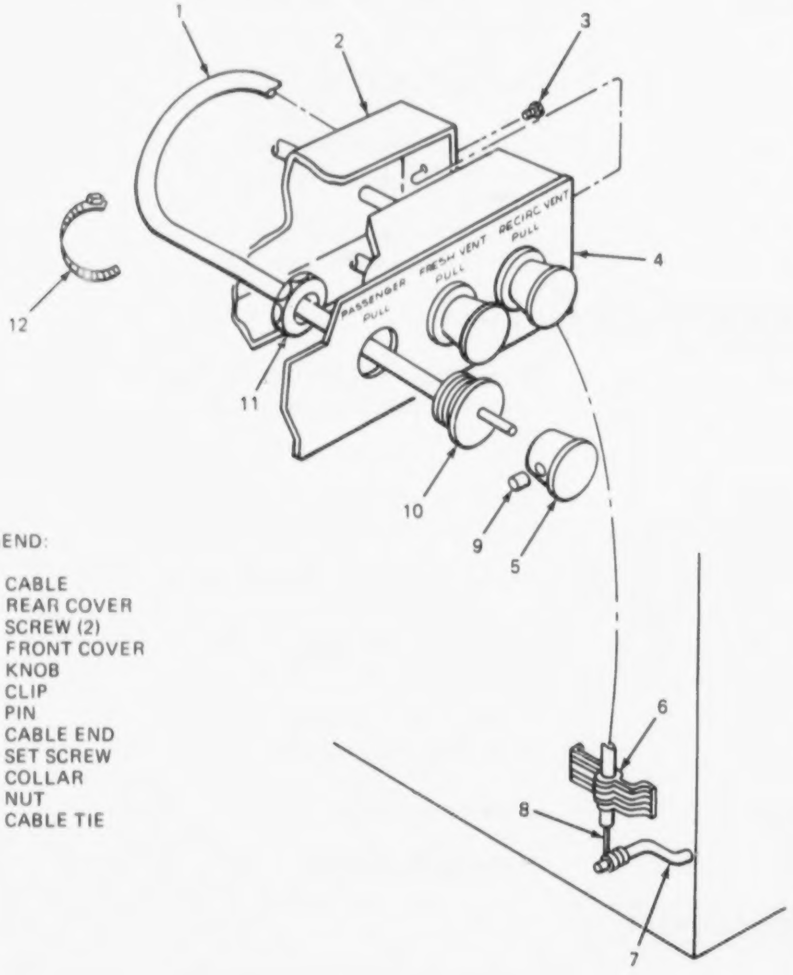
Engine Off.
Park Brake Set.
Transmission In Neutral.

11-28 HEATER CONTROL PANEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

CAUTION

This procedure tells you how to remove and install the passenger heat control knob and cable. Follow the same steps to replace controls for driver heat, fresh vent, recirculation vent, and heater. Be sure to secure a new cable tie around cables after task completion to prevent contact and possible electrical short against air pressure warning switch located on the firewall.



LEGEND:

1. CABLE
2. REAR COVER
3. SCREW (2)
4. FRONT COVER
5. KNOB
6. CLIP
7. PIN
8. CABLE END
9. SET SCREW
10. COLLAR
11. NUT
12. CABLE TIE

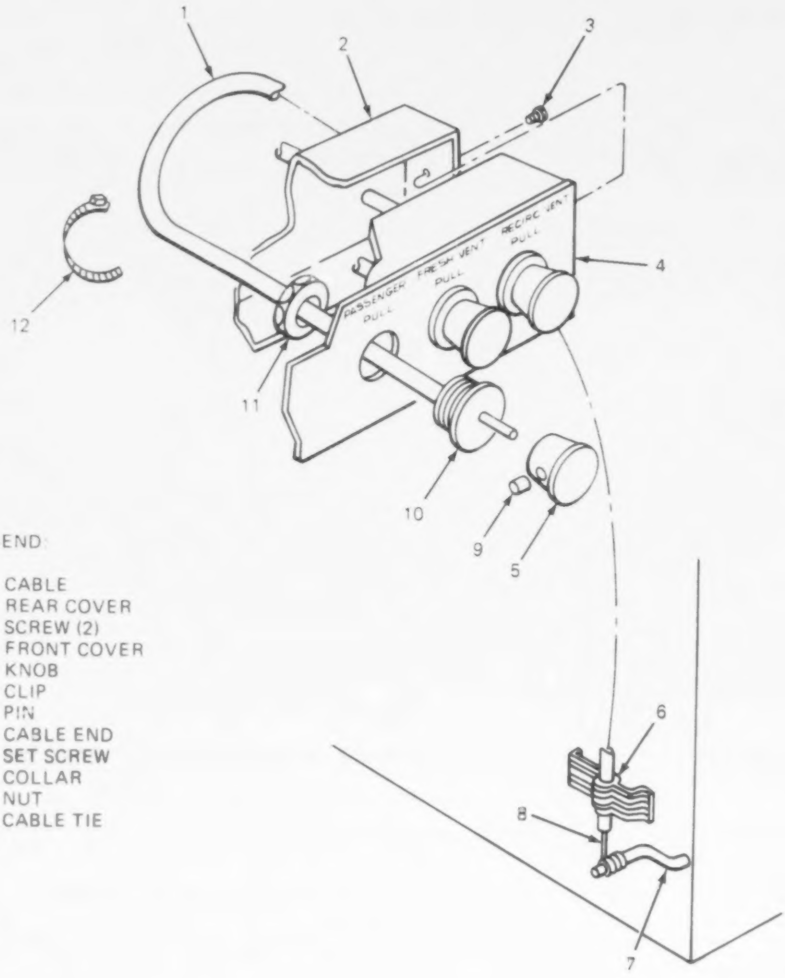
TA211957

11-28. HEATER CONTROL PANEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL OF KNOB AND CABLE.		
1. Clip (6).	Loosen. Remove cable (1) from clip.	
2. Cable end (8).	Slide off of pin (7).	
3. Setscrew (9).	Loosen. Remove knob (5).	
4. Two screws (3).	Remove rear cover (2) from front cover (4).	
5. Nut (11).	Unscrew from collar (10).	
6. Cable tie (12)	Cut and remove from cable (1) and four other cables.	
7. Cable (1).	Remove through rear cover (2), nut (11), and front cover (4).	
B. INSTALLATION OF KNOB AND CABLE.		
8. Cable (1).	Thread cable end (8) through front cover (4), nut (11), and rear cover (2).	
9. Cable tie (12)	Install around cable (1) and four other cables.	
10. Nut (11).	Screw onto collar (10) and tighten.	
11. Rear cover (2).	Slide onto front cover (4) and secure with two screws (3).	
12. Knob (5).	a. Place onto cable (1). b. Tighten setscrew (9).	
13. Cable end (8).	Slide onto pin (7).	
14. Cable (1).	Fasten with clip (6).	
C. OPERATIONAL CHECK.		
15. Knob (5).	Pull out and push in. Check that pin (7) swings as you move the knob.	Check for binding in cable (1), if pin (7) fails to swing.

11-28. HEATER CONTROL PANEL MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS


1
2
3
4
PASSENGER PULL
FRESH VENT PULL
RECIRC VENT PULL
5
6
7
8
9
10
11
12

LEGEND:

1. CABLE
2. REAR COVER
3. SCREW (2)
4. FRONT COVER
5. KNOB
6. CLIP
7. PIN
8. CABLE END
9. SET SCREW
10. COLLAR
11. NUT
12. CABLE TIE

TA211958

11-29. HEATER CONTROL VALVE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(15)
	30 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

BODY AND CAB.

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

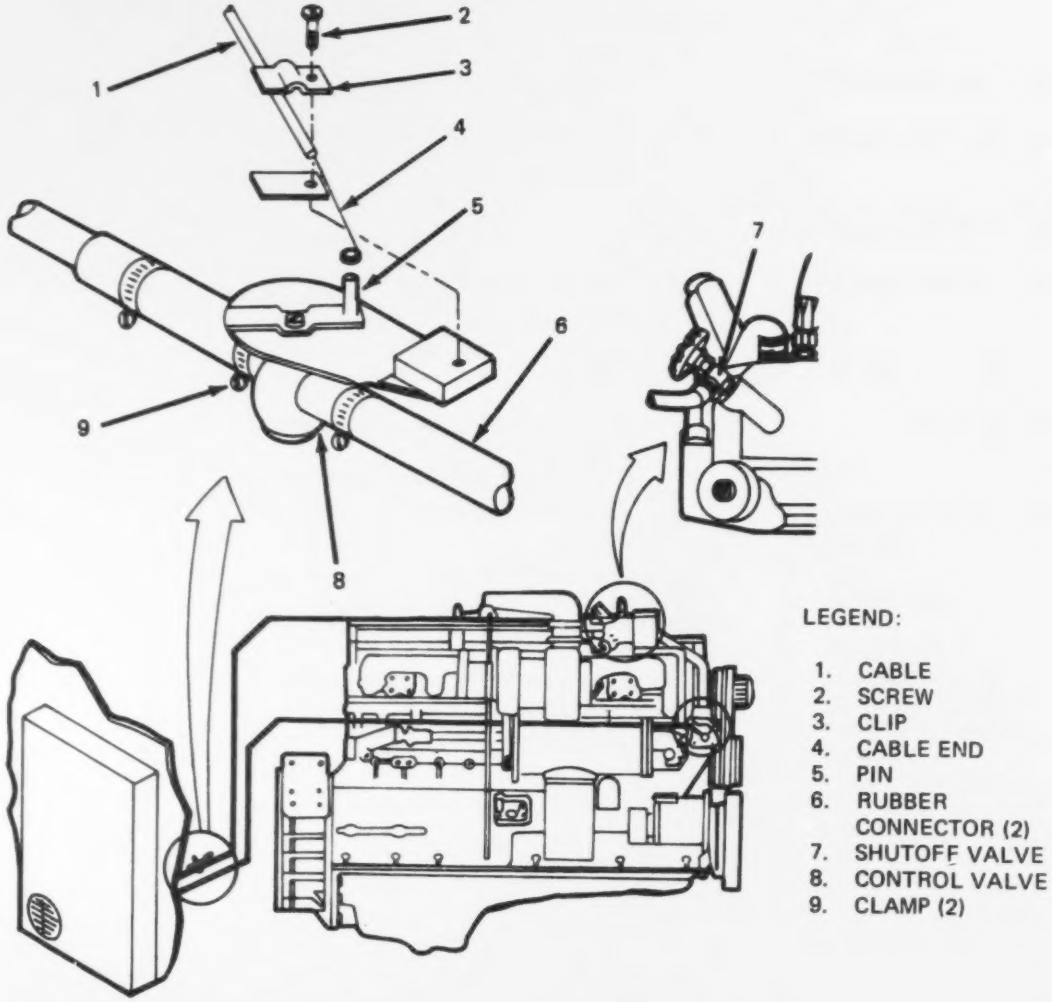
LOCATION/ITEM	ACTION	REMARKS

NOTE

Control knob and cable replacement procedures are given in paragraph 11-28.

A. REMOVAL.

1. Shutoff valve (7). Close (turn handle clockwise).



LEGEND:

1. CABLE
2. SCREW
3. CLIP
4. CABLE END
5. PIN
6. RUBBER CONNECTOR (2)
7. SHUTOFF VALVE
8. CONTROL VALVE
9. CLAMP (2)

TA 075052

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
2. Screw (2).	Loosen. Remove cable (1) from clip (3).	
3. Cable end (4).	Slide off of pin (5).	

NOTE

Before removing control valve (8), place clean container underneath to catch spilled coolant.

LOCATION/ITEM	ACTION	REMARKS
4. Two clamps (9).	Loosen.	
5. Control valve (8).	Remove from two rubber connectors (6).	
B. INSTALLATION.		
6. Control valve (8).	Push into two rubber connectors (6).	
7. Two clamps (9).	Tighten.	
8. Cable (1).	Place in clip (3) and tighten screw (2).	
9. Cable end (4).	Slide onto pin (5).	

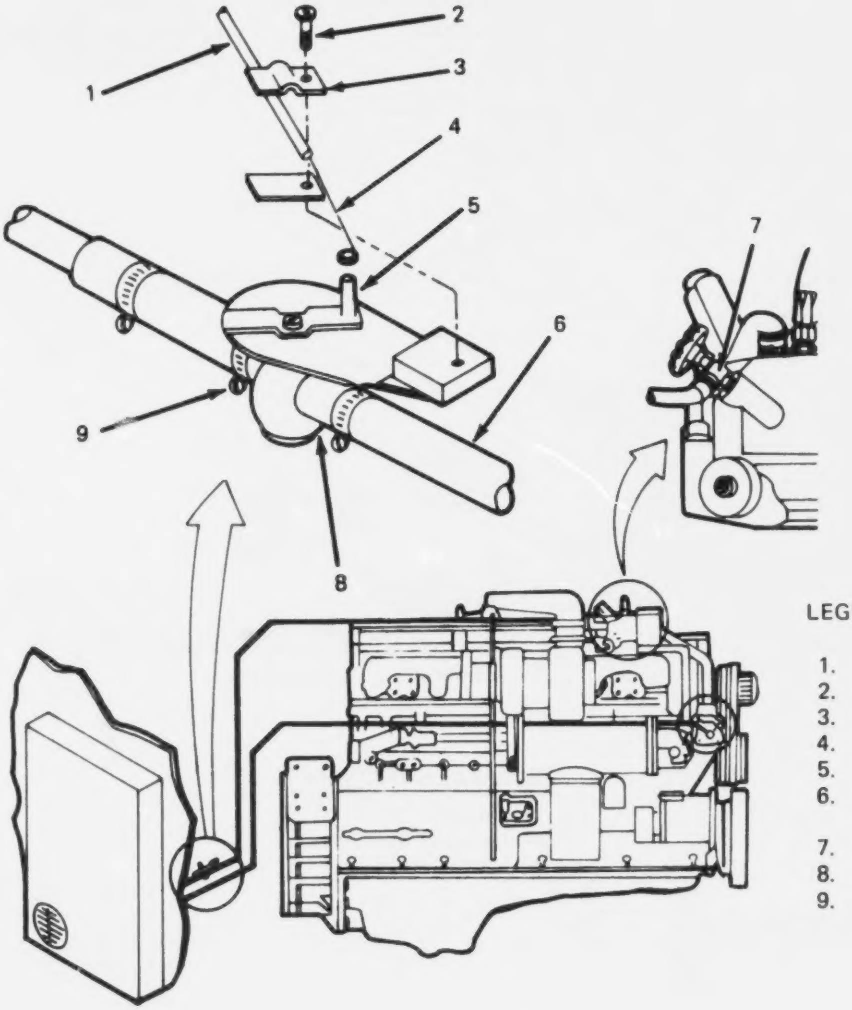
NOTE

Follow-on maintenance action required:

Bleed heater and adjust shutoff valve; refer to paragraph 4-50C.

11-29. HEATER CONTROL VALVE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. CABLE
2. SCREW
3. CLIP
4. CABLE END
5. PIN
6. RUBBER CONNECTOR (2)
7. SHUTOFF VALVE
8. CONTROL VALVE
9. CLAMP (2)

TA 075300

11-30. HEATER AIR DUCTS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(7)
b. Installation.	(8)
c. Checking for Leaks.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Hose Tie (3), PLT4A-MO (06383).

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 4-1.

SPECIAL ENVIRONMENTAL CONDITIONS

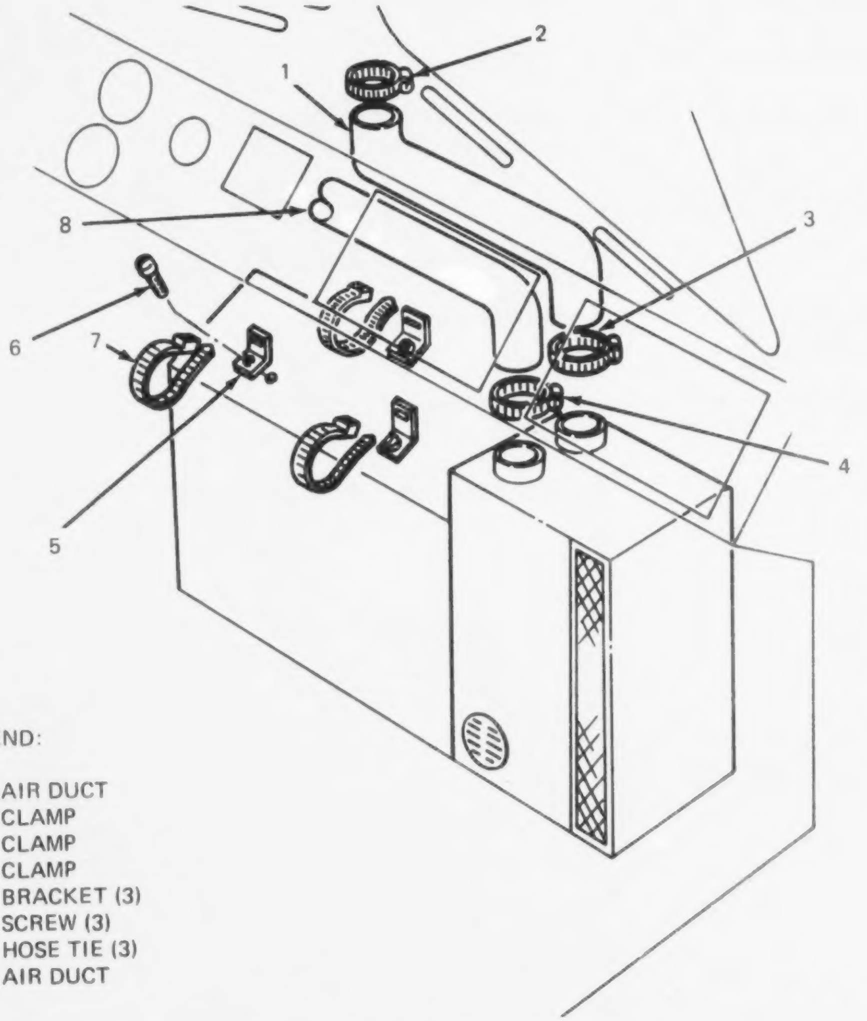
Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Clamps (2), (3), and (4).	Loosen.	
2. Three hose ties (7)	Cut and remove.	
3. Air ducts (1) and (8).	Remove.	



LEGEND:

1. AIR DUCT
2. CLAMP
3. CLAMP
4. CLAMP
5. BRACKET (3)
6. SCREW (3)
7. HOSE TIE (3)
8. AIR DUCT

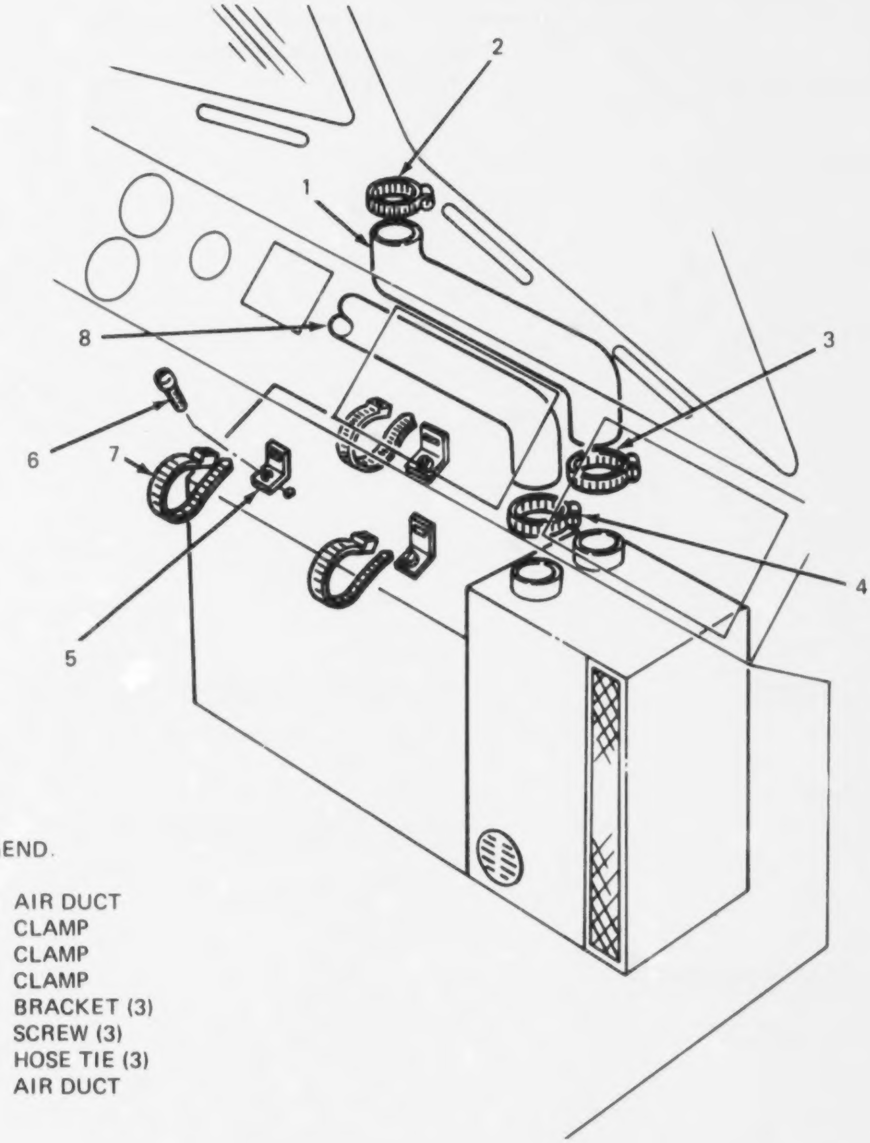
TA 075301

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Three screws (6). and three brackets (5).	Remove.	
B. INSTALLATION.		
5. Three screws (6) and brackets (5).	Install.	
6. Air ducts (1) and (8).	Set in place.	
7. Clamps (2), (3), and (4).	Tighten.	
8. Three new hose ties (7).	Install thru brackets (5) and around air ducts (1) and (8).	
C. CHECKING FOR LEAKS.		
9. Engine.	Start up (see TM 9-2320-273-10).	
10. INSTRUMENT PANEL/ heater controls.	Turn on heater and fan.	
11. Air ducts (1) and (8).	Check for leaks. Tighten clamps (2), (3) or (4) as necessary.	
12. Engine.	Shut down (see TM 9-2320-273-10).	

11-30. HEATER AIR DUCTS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND.

1. AIR DUCT
2. CLAMP
3. CLAMP
4. CLAMP
5. BRACKET (3)
6. SCREW (3)
7. HOSE TIE (3)
8. AIR DUCT

TA 075302

11-31. DATA AND INSTRUCTION PLATES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-31. DATA AND INSTRUCTION PLATES MAINTENANCE.

LOCATION/ITEM	ACTION	REMARKS
	All data and instruction plates are identified in TM 9-2320-273-10. Maintenance is limited to cleaning and replacement. To clean, use a shop rag and dry cleaning solvent. Replace by removing existing means of attachment; then install new plate and fasten with identical attaching parts.	

11-32. HOOD MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(25)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Cotter Pin, 137155 (24617).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked On Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine Off.
Transmission In Neutral.
Park Brake Set.

11-32. HOOD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

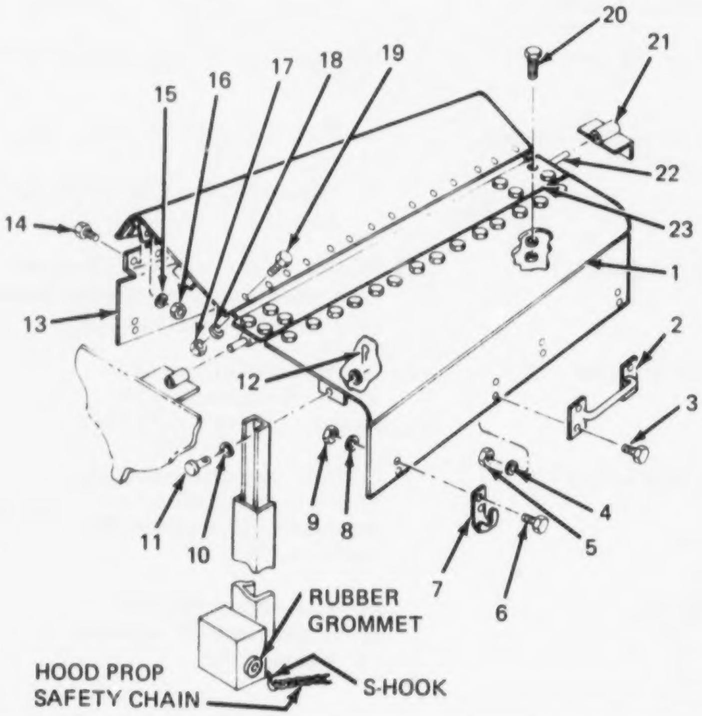
The following procedure is applicable to both the left or right hood top and side panels.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Cotter pin (12).	a. Remove and discard. b. Remove pin (11) and two washers (10).	
2. Four capscrews (3), washers (4) and nuts (5).	Unscrew and remove handle (2).	
3. Four capscrews (6), washers (8) and nuts (9).	Unscrew and remove two hook brackets (7).	

LEGEND:

1. HOOD TOP PANEL
2. HANDLE
3. CAPSCREW (4)
4. WASHER (4)
5. NUT (4)
6. CAPSCREW (4)
7. HOOK BRACKET (2)
8. WASHER (4)
9. NUT (4)
10. WASHER (2)
11. PIN
12. COTTER PIN
13. HOOD SIDE PANEL
14. CAPSCREW (14)
15. WASHER (14)
16. NUT (14)
17. NUT (14)
18. WASHER (28)
19. CAPSCREW (14)
20. CAPSCREW, WASHER, AND NUT (4)
21. FRONT BRACKET
22. PIN PLATE
23. HOOD CENTER PANEL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5
7
6
RUBBER GROMMET
HOOD PROP SAFETY CHAIN
S-HOOK

TA 075303

11-32. HOOD MAINTENANCE (Continued).

A. REMOVAL (Continued).

LOCATION/ITEM	ACTION	REMARKS
4. Fourteen capscrews (14), washers (15) and nuts (16).	Unscrew and remove hood side panel (13).	
5. Fourteen capscrews (19), twenty-eight washers (18), and fourteen nuts (17).	Unscrew and remove hood top panel (1).	
6. Four capscrews, washers, and nuts (20).	a. Remove from pin plate (22). b. Slide pin plate (22) from front bracket (21).	
7. Hood center panel (23).	Remove from rear bracket (21) on firewall.	

NOTE

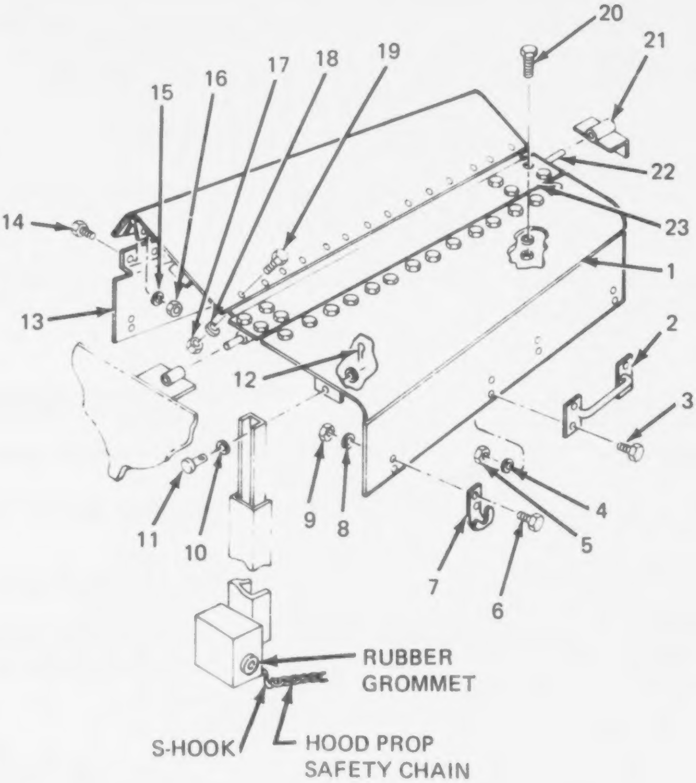
Inspect hood prop safety chains, S-hooks, and rubber grommets for damage. Replace as necessary.

B. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
8. Hood center panel (23).	Insert pin into rear bracket (21) on firewall.	
9. Four capscrews, washers, and nuts (20).	a. Insert pin plate (22) into front bracket (21). b. Install pin plate (22) to center panel (23).	
10. Hood top panel (1).	Position and secure with fourteen capscrews (19), twenty-eight washers (18) and fourteen nuts (17).	
11. Hood side panel (13).	Position and secure with fourteen capscrews (14), washers (15) and nuts (16).	
12. Hood brackets (7).	Position on hood side panel (13) and secure with four capscrews (6), washers (8) and nuts (9).	
13. Handle (2).	Position and secure with four capscrews (3), washers (4) and nuts (5).	

11-32. HOOD MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
14. Two washers (10) and pin (11).	Insert and secure with cotter pin (12).	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6
RUBBER GROMMET
S-HOOK
HOOD PROP SAFETY CHAIN

LEGEND:

1. HOOD TOP PANEL
2. HANDLE
3. CAPSCREW (4)
4. WASHER (4)
5. NUT (4)
6. CAPSCREW (4)
7. HOOK BRACKET (2)
8. WASHER (4)
9. NUT (4)
10. WASHER (2)
11. PIN
12. COTTER PIN
13. HOOD SIDE PANEL
14. CAPSCREW (14)
15. WASHER (14)
16. NUT (14)
17. NUT (14)
18. WASHER (28)
19. CAPSCREW (14)
20. CAPSCREW, WASHER, AND NUT (4)
21. FRONT BRACKET
22. PIN PLATE
23. HOOD CENTER PANEL

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BODY AND CAB.

11-33. TAIL ROLLER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(20)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Hoist.
Jack Stands.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
11-19A.	Mud Flaps Removed.
11-9A.	Tow Eyes Removed.
5-50A.	Blackout Tail Lamps Removed.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

REFERENCES (TROUBLESHOOTING)

None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.
Use Suitable Jack Stands and Hoist to Support Tail Roller Assembly; it is Very Heavy.

11-33. TAIL ROLLER MAINTENANCE (Continued).

WARNING

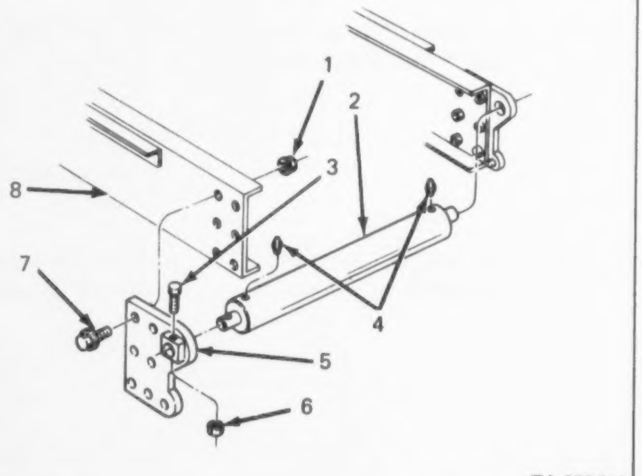
The Tail Roller is very heavy. Use extreme caution when raising or lowering to prevent injury if it should fall.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. One roller mounting bracket (5).	Support with suitable jack stand.	Choose the roller mounting bracket on the side where bolt (3) and nut (6) are used.
2. Tail roller (2).	Support with suitable hoist.	
3. Four washer base bolts (7) and washer base nuts (2).	Remove from roller mounting bracket (5) and the frame rail (8).	
4. Tail roller (2) with assembled roller mounting bracket (5).	a. Move tail roller in the direction of the roller mounting bracket without bolts. The tail roller's axle shaft will be pulled out of the other roller mounting bracket. b. Slowly lower jackstand and hoist.	Second mechanic guides assembly to the ground.

LEGEND:

1. WASHER BASE NUT (8)
2. TAIL ROLLER
3. BOLT
4. LUBRICATION FITTING (2)
5. ROLLER MOUNTING BRACKET (2)
6. NUT
7. WASHER BASE BOLT (8)
8. FRAME RAIL (2)



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11-33. TAIL ROLLER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
5. One bolt (3), one nut (6), and the roller mounting bracket (5).	Remove.	
6. Roller mounting bracket (5) and tail roller (2).	Pull tail roller's axle shaft out of roller mounting bracket.	
7. Four washer base nuts (1) and washer base bolts (7).	Unscrew and remove second roller mounting bracket (4).	Removal is necessary only if replacement is needed due to wear or damage.
	NOTE If bearings inside tail roller or axle shaft are to be serviced, refer to Direct Support Maintenance.	
B. INSTALLATION.		
8. One roller mounting bracket (5).	Aline with holes in frame rail (8) and install with four washer base bolts (7) and washer base nuts (1).	Make sure you use correct holes in roller mounting bracket. M916 uses two top rows; M920 uses bottom two rows.
9. Second roller mounting bracket (5).	Slide over axle shaft of tail roller (2) and secure with bolt (3) and nut (6).	
10. Tail roller (2) with assembled roller mounting bracket (5).	a. Lift into position with hoist and aline mounting holes with those in frame rails (8) and tail roller axle into first roller mounting bracket already installed. b. Block in position with axle stands.	First mechanic operates hoist while second guides assembly.
11. Four washer base bolts (7) and washer base nuts (1).	Install thru second roller mounting bracket (5) and frame rail (8).	Make sure you use correct bolt holes in roller mounting bracket. M916 uses two top rows; M920 uses bottom two rows.

11-33. TAIL ROLLER MAINTENANCE (Continued).

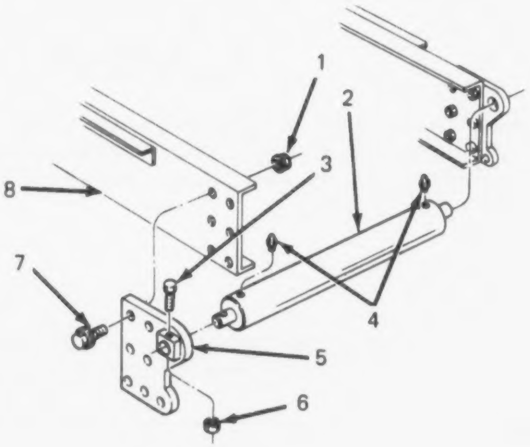
LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
12. Two lubrication fittings (4).	Clean, inspect and lubricate using grease gun (see LO 9-2320-273-12).	Refer to Direct Support Maintenance if replacement is necessary.

Follow-on maintenance action required:

a. Install blackout tail lamps (para 5-50B).
b. Install tow eyes (para 11-9B).
c. Install mud flaps (para 11-19B).

LEGEND:

1. WASHER BASE NUT (8)
2. TAIL ROLLER
3. BOLT
4. LUBRICATION FITTING (2)
5. ROLLER MOUNTING BRACKET (2)
6. NUT
7. WASHER BASE BOLT (8)
8. FRAME RAIL (2)



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CHAPTER 12

WINCH AND PTO LINKAGE MAINTENANCE

12-1. OVERVIEW.

This chapter provides you with the following information related to winch and power takeoff maintenance:

- *a.* All required special tools and equipment.
- *b.* Other technical manuals.
- *c.* Troubleshooting procedures.
- *d.* Maintenance procedures.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

12-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

12-3. SPECIAL TOOLS, TMDE, SUPPORT EQUIPMENT.

The special tools, TMDE and support equipment required for the winch and power takeoff maintenance procedures described in this chapter are limited to the oil filter strap wrench. (Refer to Organizational Maintenance RPSTL, TM 9-2320-273-20P for tool description and illustration.)

12-4. SPARES AND REPAIR PARTS.

Spares and repair parts are listed and illustrated in the Repair Parts and Special Tools List covering Organizational Maintenance for this equipment (TM 9-2320-273-20P).

Section II TROUBLESHOOTING

12-5. INTRODUCTION.

Tables 12-1 and 12-2 contain instructions for troubleshooting the winch and the power takeoff, which are driven by the transmission. The corrective actions tell you how to fix the

12-5. INTRODUCTION (Continued).

problem or refer you to a procedure that will fix the problem. The Troubleshooting tables are arranged by malfunctions in the following order:

WINCH (M916 and M920) (Table 12-1)

a. Winch operates in one direction only.

b. Winch does not operate in either direction.

c. Winch operates at one speed only.

d. Winch will not hold suspended load.

POWER TAKEOFF (PTO) (M916 thru M920) (Table 12-2).

a. PTO will not engage.

b. PTO is excessively noisy.

Section III MAINTENANCE PROCEDURES

12-6. INTRODUCTION.

This section provides you with Organizational Level maintenance procedures for the winch. The scope of maintenance is limited to the work listed in the following summary of task procedures.

Table 12-1. Winch Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. WINCH OPERATES IN ONE DIRECTION ONLY:

Step 1. Inspect all oil lines for damage and leakage.

Replace lines (para 12-13).

Step 2. Inspect directional control valve for leakage.

Tighten connections or replace valve (para 12-11).

Step 3. Check winch motor for leakage and visible signs of overheating.

Replace winch motor (para 12-14).

Step 4. Check to see if pilot orifice in winch brake valve is plugged.

Clean orifice.

2. WINCH DOES NOT OPERATE IN EITHER DIRECTION:

Step 1. Check all oil lines for damage and leakage.

Tighten loose connections and replace defective components.

Step 2. Check pump inlet strainer and in line filter for clogging.

Replace filter element (para 12-9 and 12-10).

Step 3. Check reservoir for proper oil level.

Fill to proper level (LO 9-2320-273-12).

Step 4. Check pump for leakage and visible signs of overheating.

Replace pump (para 12-15).

Step 5. Connect a pressure gage in line between each control valve and winch motor (one at a time) and attempt to operate.

If pressure is normal (2350 psi maximum), refer winch to Direct Support Maintenance for replacement.

Table 12-1. Winch Troubleshooting Procedures (Continued).

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

3. WINCH OPERATES AT ONE SPEED ONLY:

Check the auxiliary control valve for damage and leakage.

a. Tighten or repair leaking connections or lines.

b. Replace valve (para 12-11).

c. Check rear gear section of dual pump (refer to Direct Support).

4. WINCH WILL NOT HOLD SUSPENDED LOAD:

Step 1. Check failsafe brake disk to see if it is oil soaked.

Replace brake assembly.

Step 2. Check failsafe brake disks for wear.

Replace brake.

Table 12-2. Power Takeoff (PTO) Troubleshooting Procedures.

MALFUNCTION.

TEST OR INSPECTION.

CORRECTIVE ACTION.

1. PTO WILL NOT ENGAGE:

Have an assistant attempt to engage the PTO (TM 9-2320-273-10) and visually check the shift rod (lever) on the PTO for movement.

a. If shift does not move, replace PTO linkage (para 12-16).

b. If the shift rod moves, refer the problem to Direct Support Maintenance for PTO replacement.

2. PTO IS EXCESSIVELY NOISY:

Notify Direct Support Maintenance.

12-7. WINCH MAINTENANCE TASK SUMMARY.

INITIAL SETUP

APPLICABLE CONFIGURATIONS	EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
M916 and M920.	None.	None.

TEST EQUIPMENT

None.

TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.
Marking Pen.
Filter Element, 74011 (34623).
Oil (1 qt).
Gasket (9995).
Gasket (2), 11027 (34623).
Pin Kit, 1V1701 (34623).
Non-flammable Dry Cleaning Solvent SD-2 (Refer to Appendix C).
Liquid Teflon (Refer to Appendix C).
Masking Tape.
Plugs.
Gasket, Hydraulic Motor to Failsafe Brake, 28426 (34625).

PERSONNEL REQUIRED

Two MOS-63B20)

REFERENCES (TM)

TM 9-2320-273-10
TM 9-2320-273-20P
LO 9-2320-273-12

REFERENCES (TROUBLESHOOTING)

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked Level.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-7. WINCH MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
1.	Winch Cable Maintenance:	12-8	
	A. Removal.	12-8A	12-1
	B. Installation.	12-8B	12-2
2.	Inline Filter Maintenance:	12-9	12-1
	A. Removal.	12-9A	12-2
	B. Installation.	12-9B	
	C. Checking for Leaks.	12-9C	
3.	Reservoir Screen and Strainer Maintenance:	12-10	12-1
	A. Removal.	12-10A	12-2
	B. Cleaning.	12-10B	
	C. Installation.	12-10C	
4.	Control Valves Maintenance:	12-11	
	A. Removal.	12-11A	12-1
	B. Installation.	12-11B	12-2
	C. Operational Check.	12-11C.	
5.	Throttle Maintenance:	12-12	
	A. Removal.	12-12A	12-1
	B. Cleaning and Inspection.	12-12B	12-2
	C. Installation.	12-12C	
	D. Operational Check.	12-12D	
6.	Hydraulic Lines and Fittings Maintenance:	12-13	12-1
	A. Removal.	12-13A	12-2
	B. Installation.	12-13B	
	C. Checking for Leaks.	12-13C	

12-7. WINCH MAINTENANCE TASK SUMMARY (Continued).

LIST OF TASKS

TASK NO.	TASK	TASK REF	TROUBLESHOOTING REF (TABLE)
7.	Hydraulic Motor Maintenance:	12-14	12-1
	A. Removal.	12-14A	12-2
	B. Cleaning and Inspection.	12-14B	
	C. Installation and Operational Check.	12-14C	
8.	Hydraulic Pump Maintenance:	12-15	12-1
	A. Removal.	12-15A	12-2
	B. Installation.	12-15B	
	C. Operational Check.	12-15C	
9.	PTO Linkage Maintenance:	12-16	12-1
	A. Removal.	12-16A	12-2
	B. Installation.	12-16B	
	C. Operational Check.	12-16C	

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12-8. WINCH CABLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(20)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

Two (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

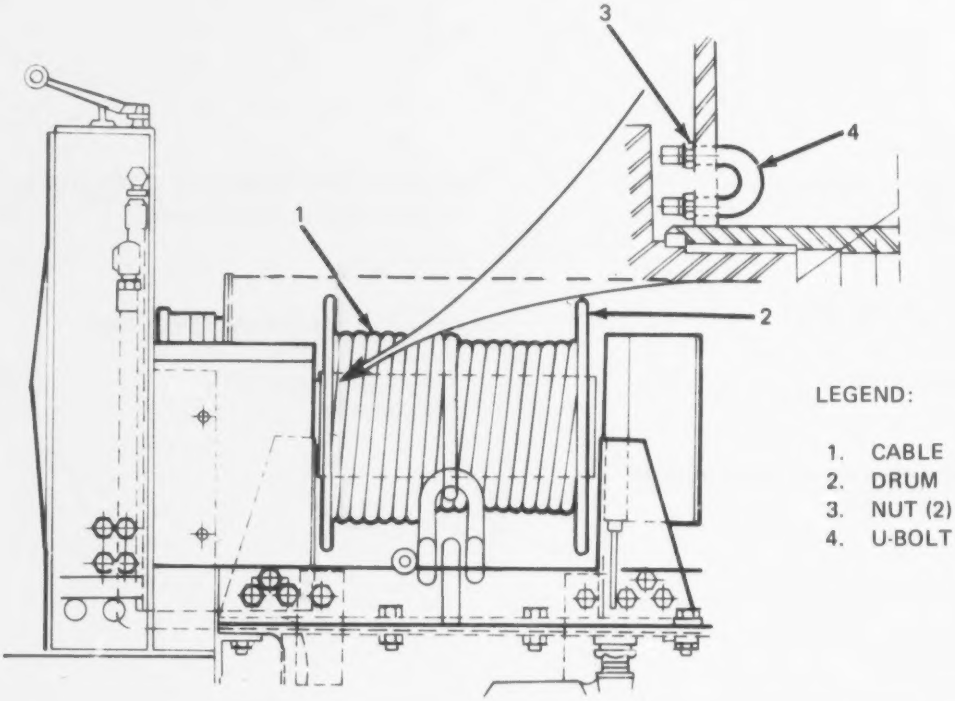
GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

WINCH.

12-8. WINCH CABLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Cable (1).	Unreel from drum (2).	Refer to TM 9-2320-273-10.
2. Nuts (3).	Remove.	
3. U-bolt (4).	Remove.	
B. INSTALLATION.		
4. U-bolt (4).	Install through holes on side of drum.	
5. Nuts (3).	Screw onto U-bolt (4). Do not tighten at this time.	
6. Cable (1).	Slide unswaged end of cable between U-bolt (4) and drum (2). Cable should protrude approximately 1.00 inch.	
7. Nuts (3).	Tighten.	
8. Cable (1).	Rewind on drum (2).	Refer to TM 9-2320-273-10.



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12-9. INLINE FILTER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Installation.	(5)
c. Checking for Leaks.	(5)
	15 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Filter Element, 74011 (34623).
Oil, 1 qt (1 liter) (refer to appendix C).
Container.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

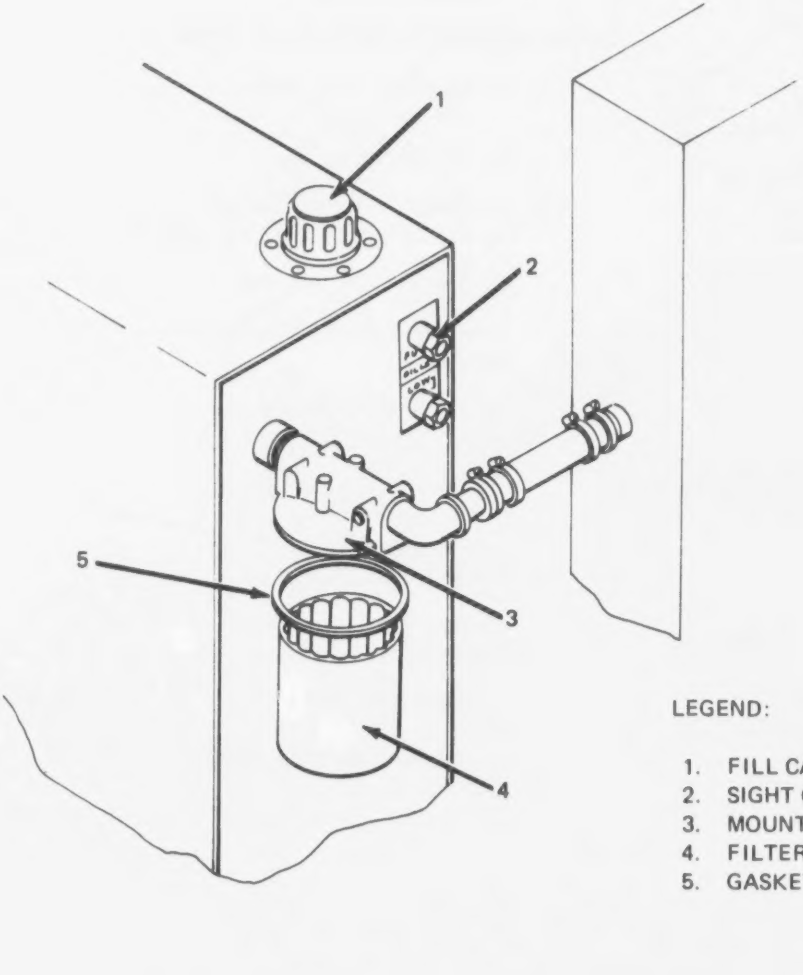
WINCH.

12-9. INLINE FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. SIGHT GLASS
3. MOUNTING PLATE
4. FILTER
5. GASKET

TA 075307

12-9. INLINE FILTER MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Filter (4).	Using wrench, unscrew and throw away.	Place container under filter.
2. Gasket (5).	Inspect.	Replace if necessary.

B. INSTALLATION.

CAUTION

Do not use strap wrench to install filter.

LOCATION/ITEM	ACTION	REMARKS
3. Filter (4).	a. Pour in 1 qt (1 liter) oil. b. Install gasket (5). c. Screw on until filter top just touches mounting plate (3). d. Tighten 1/4 turn more.	
4. Sight glass (2).	Check that oil is visible in top sight glass.	Add oil if necessary.
5. Fill cap (1).	Screw on and tighten.	

C. CHECKING FOR LEAKS.

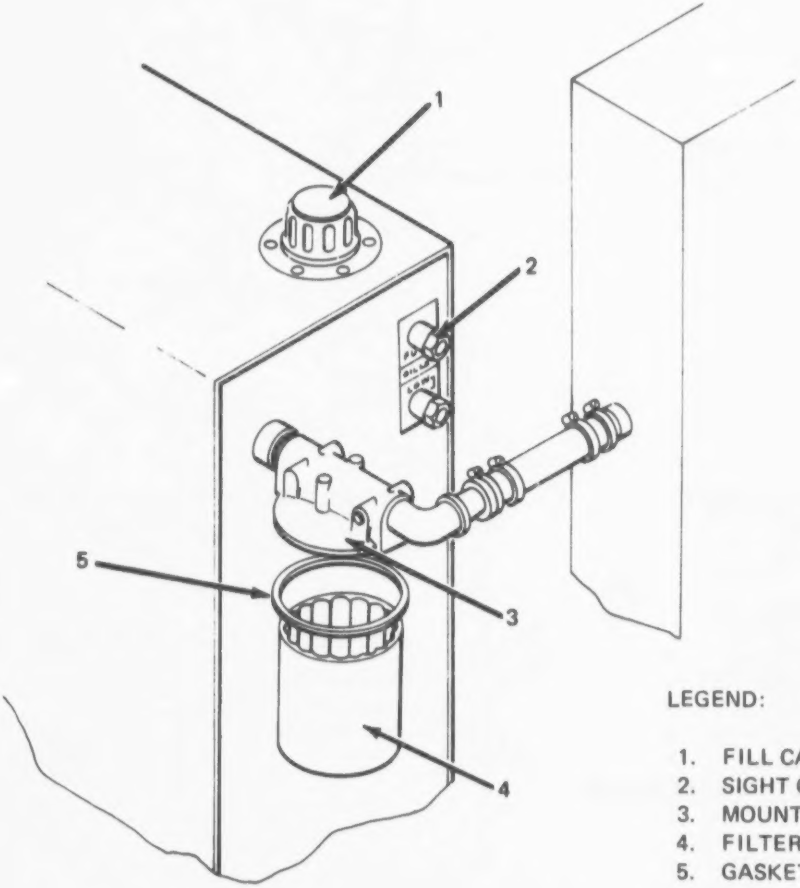
LOCATION/ITEM	ACTION	REMARKS
6. Engine.	Start up (see TM 9-2320-273-10).	
7. PTO.	Engage (see TM 9-2320-273-10).	
8. Filter (4).	Check for oil leaks.	Tighten as necessary.
9. Engine.	Shut down (see TM 9-2320-273-10).	

12-9. INLINE FILTER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

The reservoir screen and strainer should be cleaned or replaced each time you service the inline filter. See para 12-10.



LEGEND:

1. FILL CAP
2. SIGHT GLASS
3. MOUNTING PLATE
4. FILTER
5. GASKET

TA 075308

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(5)
b. Cleaning.	(10)
c. Installation.	(5)
	20 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Non-flammable Cleaning Solvent SD-2 (refer to appendix C).
Clean Container.
Gasket (2), 11027 (34623).

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

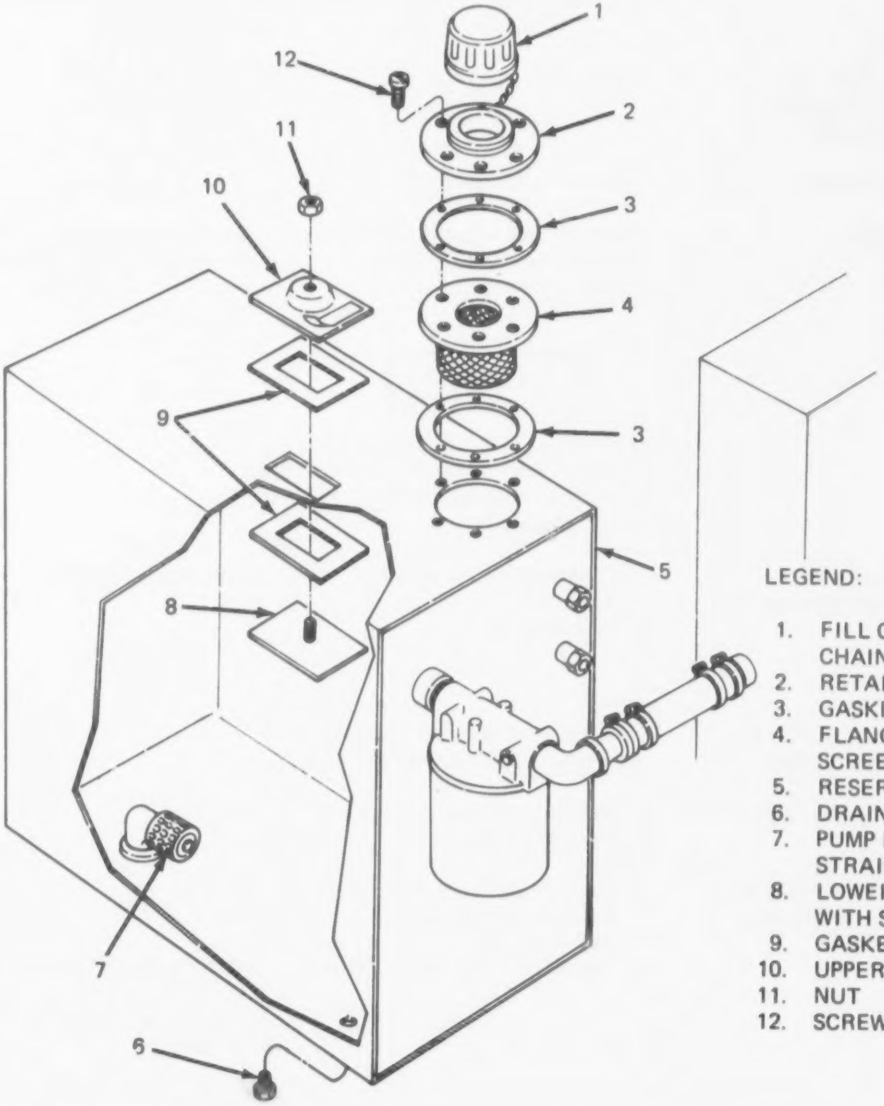
Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Winch system retains some pressure even when not in use. Remove fill cap (1) slowly.



LEGEND:

1. FILL CAP AND CHAIN
2. RETAINER
3. GASKET (2)
4. FLANGE WITH SCREEN
5. RESERVOIR
6. DRAIN PLUG
7. PUMP INLET STRAINER
8. LOWER COVER WITH STUD
9. GASKET (2)
10. UPPER COVER
11. NUT
12. SCREW (6)

TA 075309

WINCH.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Fill cap with chain (1).	Unscrew.	
2. Drain plug (6).	Unscrew and drain fluid into clean container.	
3. Nut (11).	a. Loosen. b. Remove nut (11) with other hand.	Slide upper cover (10), two gaskets (9) and lower cover with stud (8) to the side with one hand.
4. Upper cover (10), two gaskets (9), and lower cover with stud (8).	Lift out of reservoir (5).	Discard gaskets (9).
5. Pump inlet strainer (7).	Unscrew and remove.	
6. Six screws (12).	Remove and lift out retainer (2), two gaskets (3), and flange and screen (4).	Inspect gaskets (3). If damaged, make from stock using old gasket for a template.

B. CLEANING.

CAUTION

Do not allow dry cleaning solvent SD-2 to come in contact with seals or flexible hoses. Such cleaners may damage leather, rubber, and synthetic materials.

LOCATION/ITEM	ACTION	REMARKS
7. Flange and screen (4) and pump inlet strainer (7).	a. Clean with dry cleaning solvent. b. Allow to dry.	If damaged, replace.

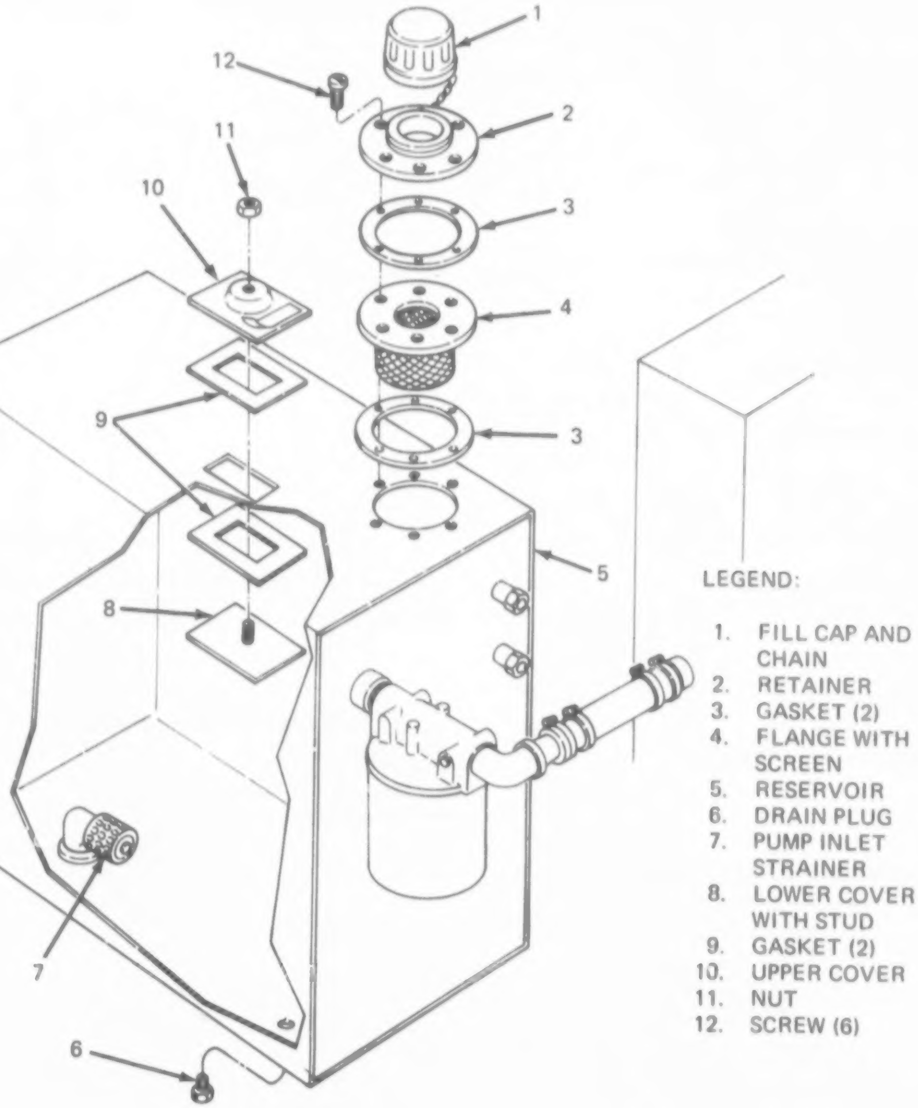
C. INSTALLATION.

LOCATION/ITEM	ACTION	REMARKS
8. Flange and screen (4), two gaskets (3) and retainer (2).	Place in reservoir fill opening and secure with six screws (12).	
9. Pump inlet strainer (7).	Insert thru access hole and screw onto pipe.	
10. Lower cover with stud (8), two new gaskets (9), and upper cover (10).	a. Hold in position with one hand at access hole in reservoir (5).	
	b. Install nut (11) and tighten.	To keep parts in proper position first turn nut (11) by hand while pulling up. Once snug, tighten with wrench.

WINCH.

12-10. RESERVOIR SCREEN AND STRAINER MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. INSTALLATION (Continued).		
11. Drain plug (6).	Screw into reservoir bottom.	
12. Reservoir (5).	Fill.	See LO 9-2320-273-12.
13. Fill cap with chain (1).	Screw on.	



LEGEND:

1. FILL CAP AND CHAIN
2. RETAINER
3. GASKET (2)
4. FLANGE WITH SCREEN
5. RESERVOIR
6. DRAIN PLUG
7. PUMP INLET STRAINER
8. LOWER COVER WITH STUD
9. GASKET (2)
10. UPPER COVER
11. NUT
12. SCREW (6)

TA 075310

12-11. CONTROL VALVES MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Installation.	(15)
c. Operational Check.	(10)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Liquid Teflon (refer to appendix C).
Plugs.
Masking Tape.
Marking Pen.
Pin Kit, IV1701 (34623).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

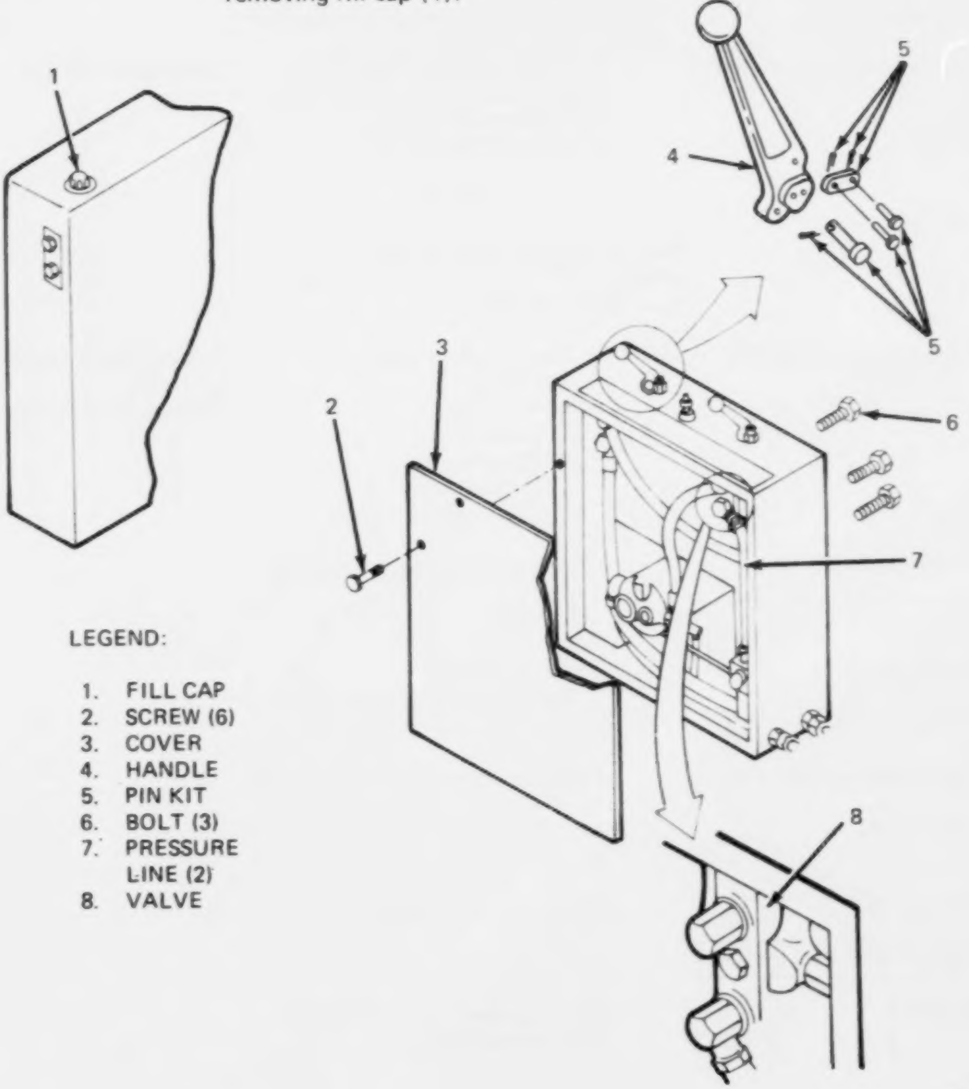
Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-11. CONTROL VALVES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. SCREW (6)
3. COVER
4. HANDLE
5. PIN KIT
6. BOLT (3)
7. PRESSURE LINE (2)
8. VALVE

TA 075311

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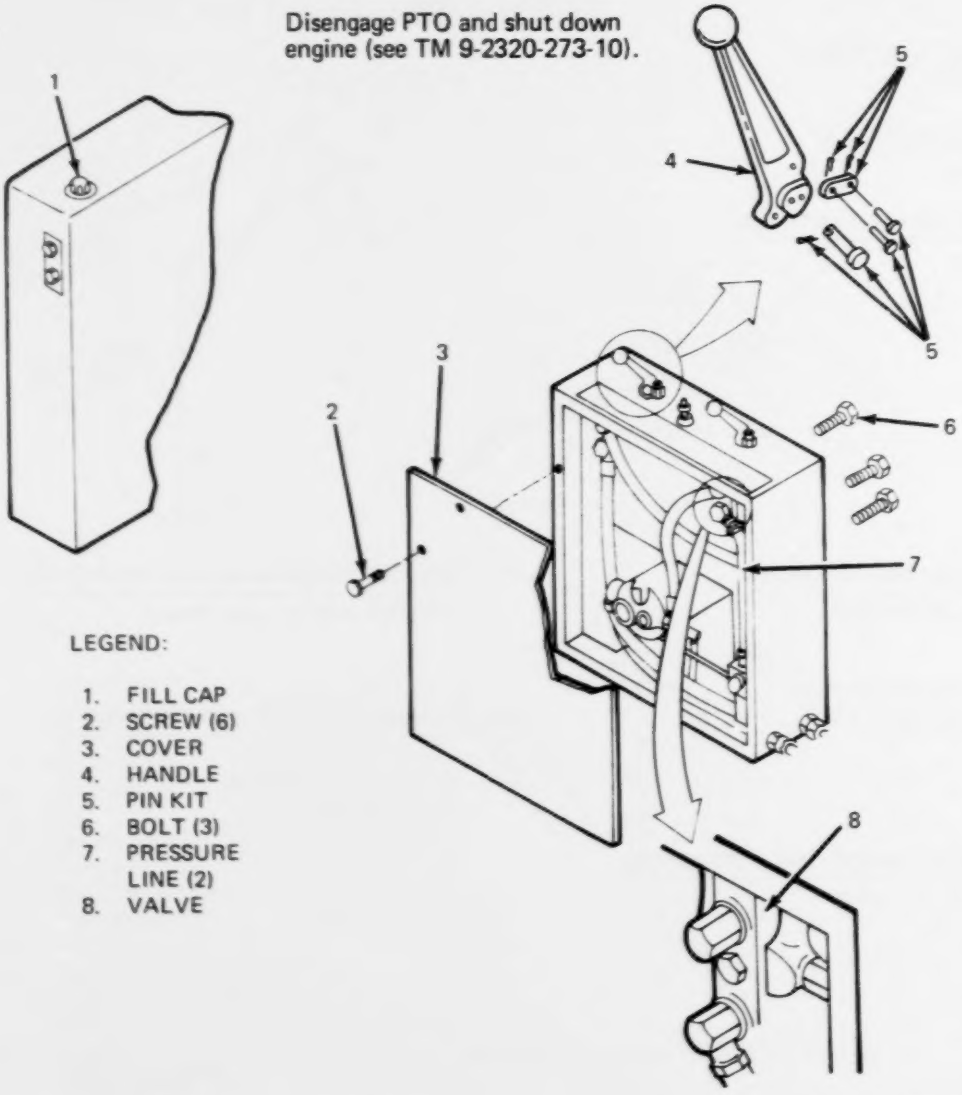
12-11. CONTROL VALVES MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
	NOTE The following procedure describes removal and installation of the directional control valve. Follow the same steps to remove and install the auxiliary control valve.	
A. REMOVAL.		
1. Six screws (2).	Unscrew and remove cover (3).	
2. Pin kit (5) and handle (4).	a. Remove three cotter pins. b. Remove three straight pins. c. Remove one plate. d. Lift off handle (4).	Discard pin kit (5).
	NOTE Plug each line as soon as you have disconnected it. This will prevent loss of fluid from the system.	
3. Two pressure lines (7).	a. Disconnect at valve (8) and plug. b. Inspect for: 1. Leaks. 2. Cracks. 3. Discoloration. 4. Damaged fittings.	Tag and mark where each line connects. Replace if necessary.
4. Three bolts (6).	Unscrew and remove valve (8).	
B. INSTALLATION.		
5. Valve (8).	a. Set in place. b. Screw on and tighten three bolts (6).	
6. Two pressure lines (7).	Unplug and connect to valve (8).	
7. Handle (4).	Attach to valve (8) with new pin kit (5).	
8. Fill cap (1).	Screw on, and tighten.	
C. OPERATIONAL CHECK.		
9. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	

12-11. CONTROL VALVES MAINTNANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
C. OPERATIONAL CHECK (Continued).		
10. Control valve (8).	Operate winch and check for: a. Leakage. b. Proper operation.	Tighten connections as necessary.
11. Cover (3).	Aline with mounting holes in winch control panel and install with six screws (2).	
12. Engine.	Disengage PTO and shut down engine (see TM 9-2320-273-10).	



LEGEND:

1. FILL CAP
2. SCREW (6)
3. COVER
4. HANDLE
5. PIN KIT
6. BOLT (3)
7. PRESSURE LINE (2)
8. VALVE

TA 075312

12-12. THROTTLE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(10)
b. Cleaning and Inspection.	(10)
c. Installation.	(10)
d. Operational Check.	(5)
	35 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

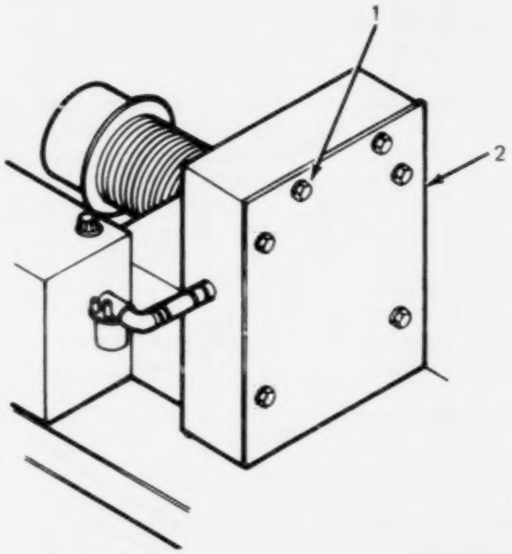
GENERAL SAFETY INSTRUCTIONS

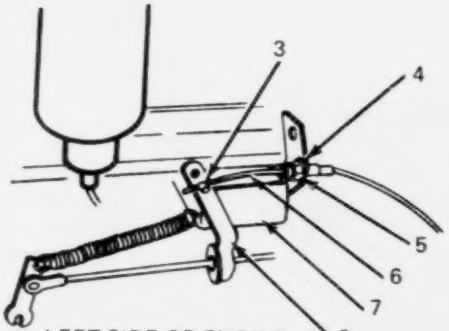
Engine OFF.
Transmission in Neutral.
Park Brake Set.

WINCH.

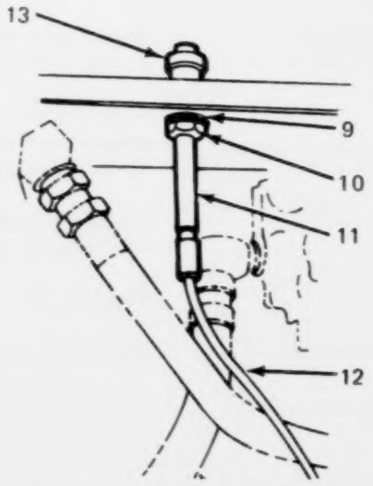
12-12. THROTTLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Setscrew (3).	Loosen from throttle arm (8) on left side of engine.	
2. Nut (5) and washer (4).	Unscrew nut from winch throttle cable threaded end (11).	





LEFT SIDE OF ENGINE



WINCH PANEL WITH COVER REMOVED

LEGEND:

1. SCREW (6)
2. WINCH PANEL COVER
3. SET SCREW
4. WASHER
5. NUT
6. CABLE WIRE
7. BRACKET
8. THROTTLE ARM
9. STAR WASHER
10. NUT
11. WINCH THROTTLE CABLE THREADED END
12. CABLE
13. WINCH THROTTLE CONTROL

TA 075313

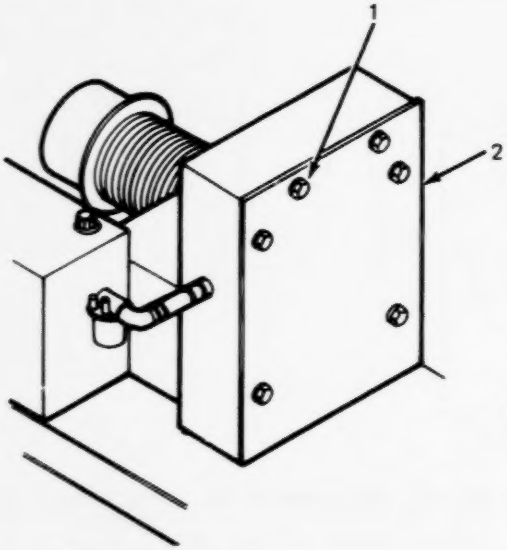
12-12. THROTTLE MAINTENANCE (Continued).

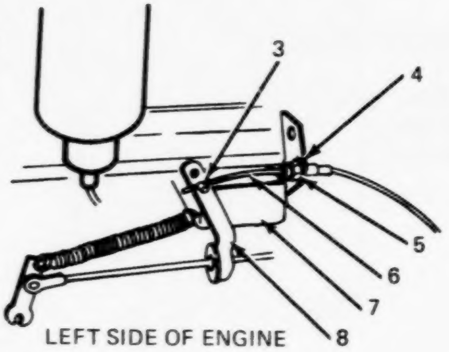
LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
3. Cable wire (6).	a. Pull free from throttle arm (8) and bracket (7). b. Feed cable wire (6) down underneath chassis.	
4. Six screws (1).	a. Remove. b. Remove winch panel cover (2).	
5. Nut (10), and starwasher (9).	Remove from winch throttle cable threaded end (11).	
6. Winch throttle control (13).	Pull up and out to remove cable (12).	Feed cable from under chassis up through winch control panel carefully so as not to damage cable.
B. CLEANING AND INSPECTION.		
7. Cable (12).	Wipe cable and threaded ends clean and inspect for: a. Cracks in cable exterior. b. Kinks which will cause binding. c. Crossed or burred threads.	Replace as necessary.
C. INSTALLATION.		
8. Winch throttle cable threaded end (11).	Install with starwasher (9) and nut (10). Tighten.	
9. Cable (12).	Feed down under chassis over cross frame brace, and up into engine compartment.	
10. Cable wire (6).	Insert through bracket (7) and into throttle arm (8).	
11. Setscrew (3).	Tighten into cable wire (6).	
12. Winch panel cover (2).	Install with six screws (1).	

WINCH.

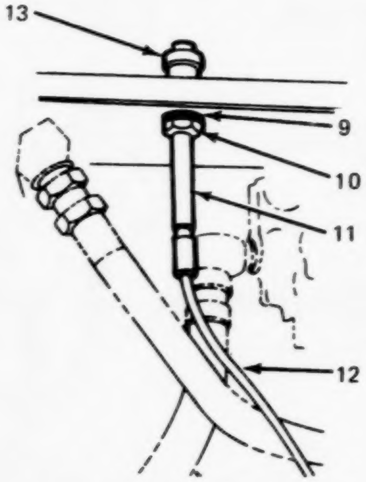
12-12. THROTTLE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
D. OPERATIONAL CHECK.		
12. Engine.	Start up and engage PTO (see TM 9-2320-273-10).	
13. Winch throttle control (13).	Operate and check that engine rpm rises and falls accordingly.	
14. Engine.	Shut down (see TM 9-2320-273-10).	





LEFT SIDE OF ENGINE



WINCH PANEL WITH COVER REMOVED

LEGEND:

1. SCREW (6)
2. WINCH PANEL COVER
3. SET SCREW
4. WASHER
5. NUT
6. CABLE WIRE
7. BRACKET
8. THROTTLE ARM
9. STAR WASHER
10. NUT
11. WINCH THROTTLE CABLE THREADED END
12. CABLE
13. WINCH THROTTLE CONTROL

TA 075314

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Installation.	(15)
c. Checking for Leaks.	(10)
	40 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Plugs.
Liquid Teflon (refer to appendix C).
Masking Tape.
Marking Pencil.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

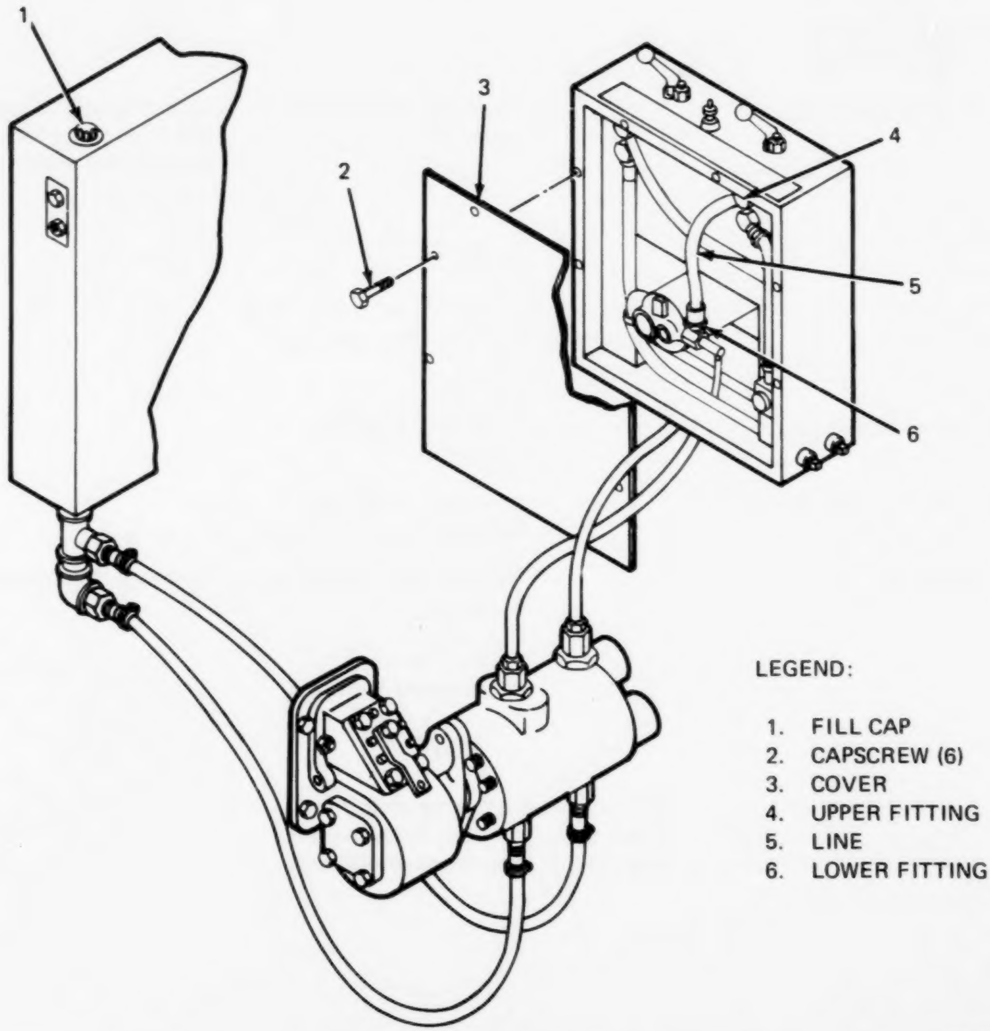
Engine OFF.
Park Brake Set.
Transmission in Neutral.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. CAPSCREW (6)
3. COVER
4. UPPER FITTING
5. LINE
6. LOWER FITTING

TA 075315

WINCH.

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

NOTE

The illustration at right shows major lines and fittings of the winch hydraulic system. The procedure describes removal and installation of the directional control valve-to-motor line, but the same steps may be used to remove and install any of the lines.

A. REMOVAL.

LOCATION/ITEM	ACTION	REMARKS
1. Six capscrews (2).	Unscrew and remove cover (3).	Skip this step if you are changing a line outside the winch panel.

NOTE

As soon as you disconnect a line, plug the port and the line. Tag and mark all lines.

LOCATION/ITEM	ACTION	REMARKS
2. Upper fitting (4).	Unscrew. Plug port and line.	
3. Lower fitting (6).	Unscrew. Plug port and line.	
4. Line (5).	Remove and inspect for: a. Cracks. b. Leaks. c. Discoloration. d. Damaged fittings.	Replace if necessary.

NOTE

If line contains a large amount of fluid, drain the fluid from the line and pour it into reservoir fill neck.

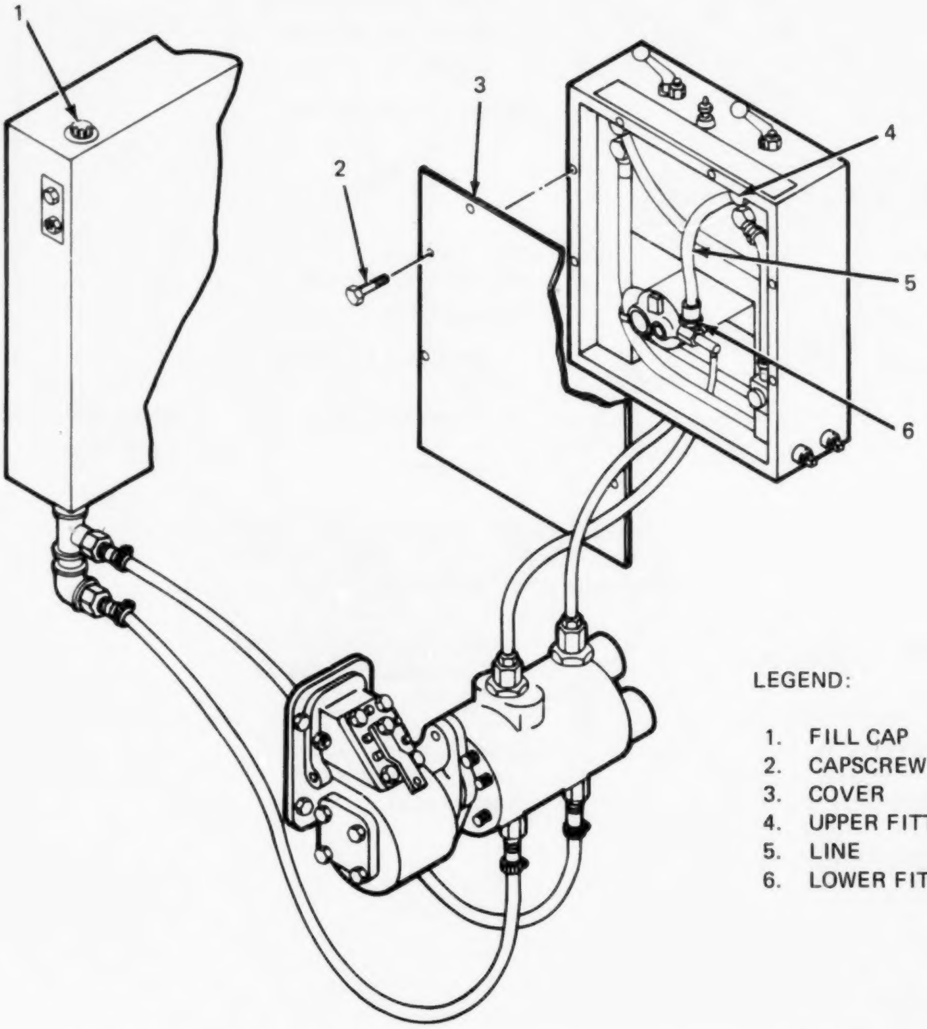
12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

B. INSTALLATION.

NOTE

Be sure that you install line between the proper ports. Use the illustration below as a reference.



LEGEND:

1. FILL CAP
2. CAPSCREW (6)
3. COVER
4. UPPER FITTING
5. LINE
6. LOWER FITTING

TA 075316

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
5. Lower fitting (6).	a. Coat threads with liquid teflon. b. Unplug port and line. Screw together and tighten.	
6. Upper fitting (4).	a. Coat threads with liquid teflon. b. Unplug port and line. Screw together and tighten.	
7. Fill cap (1).	Screw on and tighten.	
C. CHECKING FOR LEAKS.		
8. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	
9. Line (5).	a. Wipe away dirt and oil. b. Check for leaks.	 Retighten as necessary.

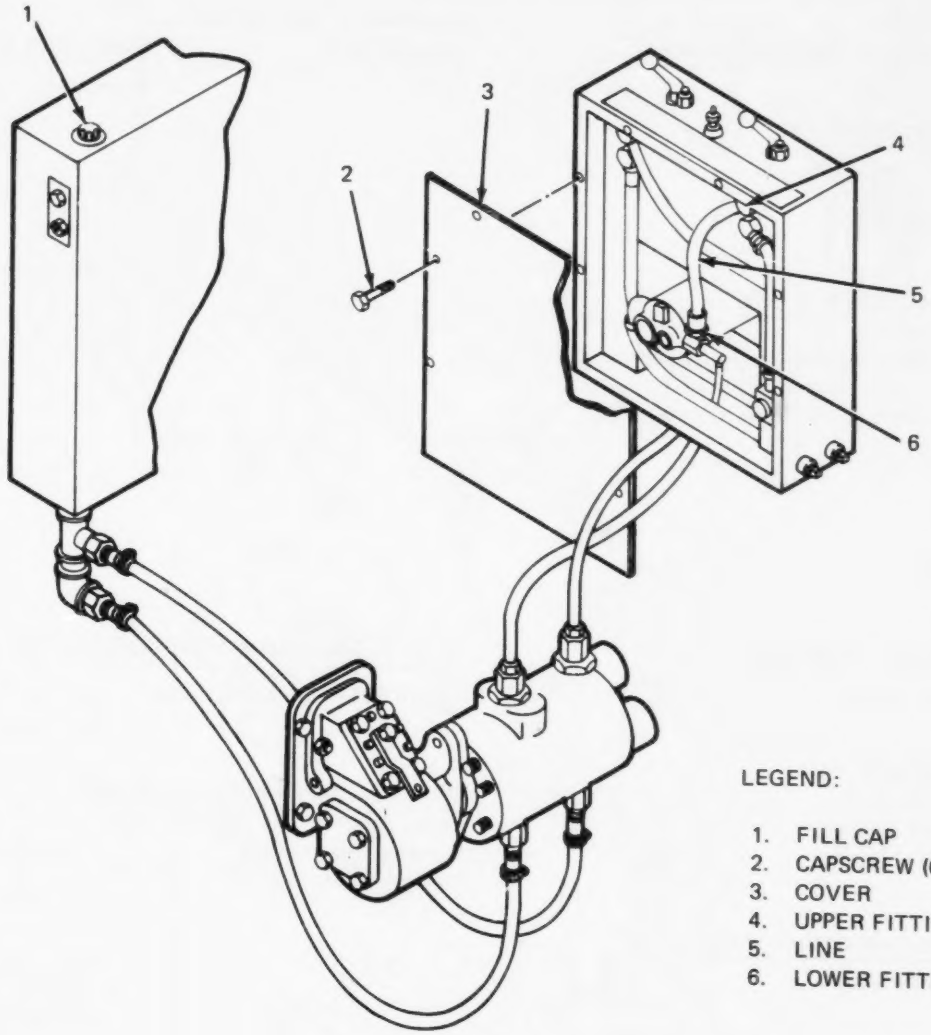
NOTE

After checking for leaks, use sight glasses to check winch oil level. Add oil if necessary (refer to LO 9-2320-273-12).

LOCATION/ITEM	ACTION	REMARKS
10. Engine.	Disengage PTO and shut down (see TM 9-2320-273-10).	
11. Cover (3).	Set in place. Screw in and tighten six capscrews (2).	

12-13. HYDRAULIC LINES AND FITTINGS MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FILL CAP
2. CAPSCREW (6)
3. COVER
4. UPPER FITTING
5. LINE
6. LOWER FITTING

TA 075317

WINCH.

12-14. HYDRAULIC MOTOR MAINTENANCE

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(15)
b. Cleaning and Inspection.	(15)
c. Installation and Operational Check.	(15)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.
Gasket, Hydraulic Motor to Failsafe Brake, 28426 (34625).
Hydraulic Oil (Refer to Appendix C).
Silastic Gasket Sealer (Refer to Appendix C).
Plugs.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

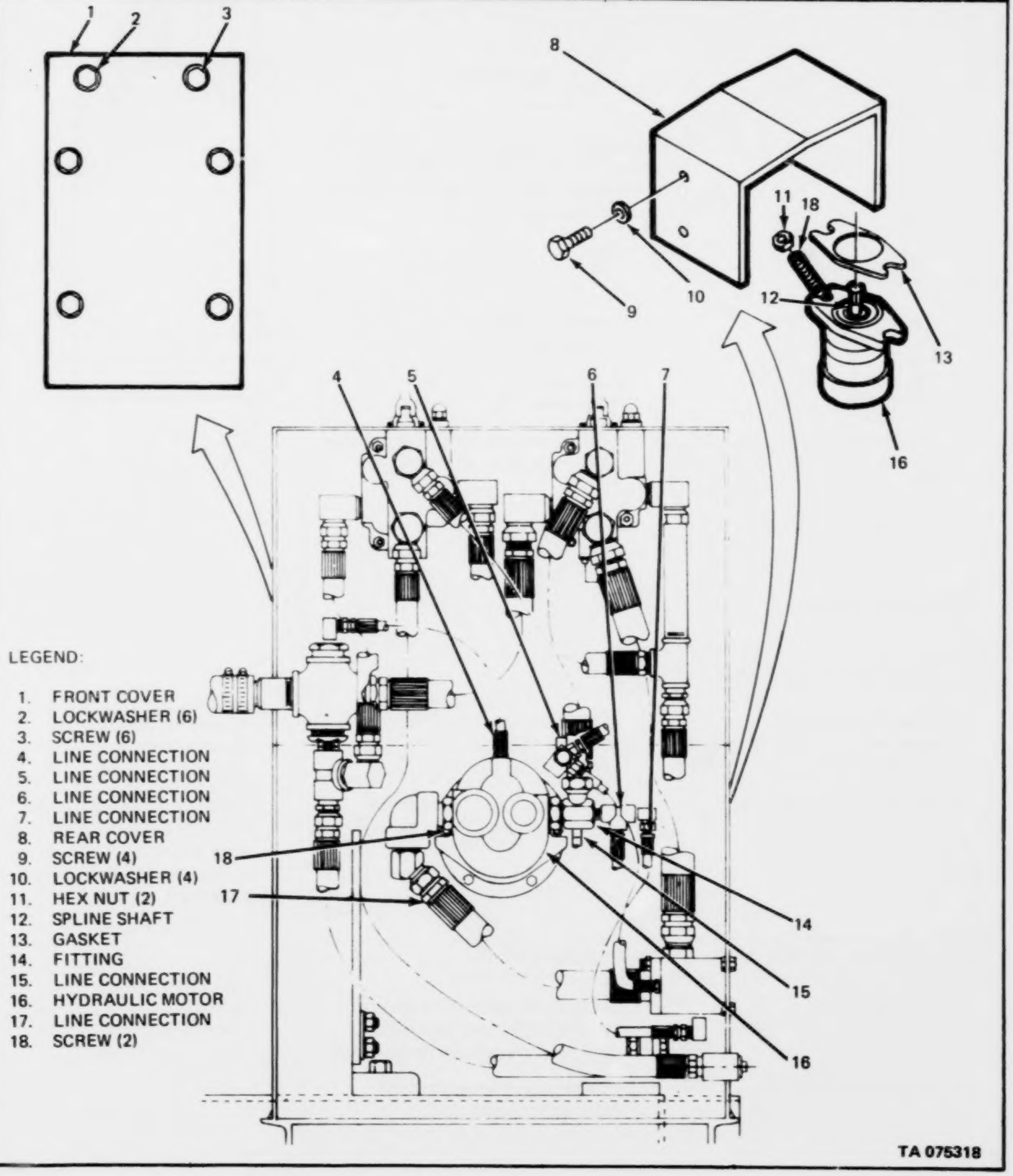
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FRONT COVER
2. LOCKWASHER (6)
3. SCREW (6)
4. LINE CONNECTION
5. LINE CONNECTION
6. LINE CONNECTION
7. LINE CONNECTION
8. REAR COVER
9. SCREW (4)
10. LOCKWASHER (4)
11. HEX NUT (2)
12. SPLINE SHAFT
13. GASKET
14. FITTING
15. LINE CONNECTION
16. HYDRAULIC MOTOR
17. LINE CONNECTION
18. SCREW (2)

TA 075318

12-14. HYDRAULIC MOTOR MAINTENANCE. (Continued).

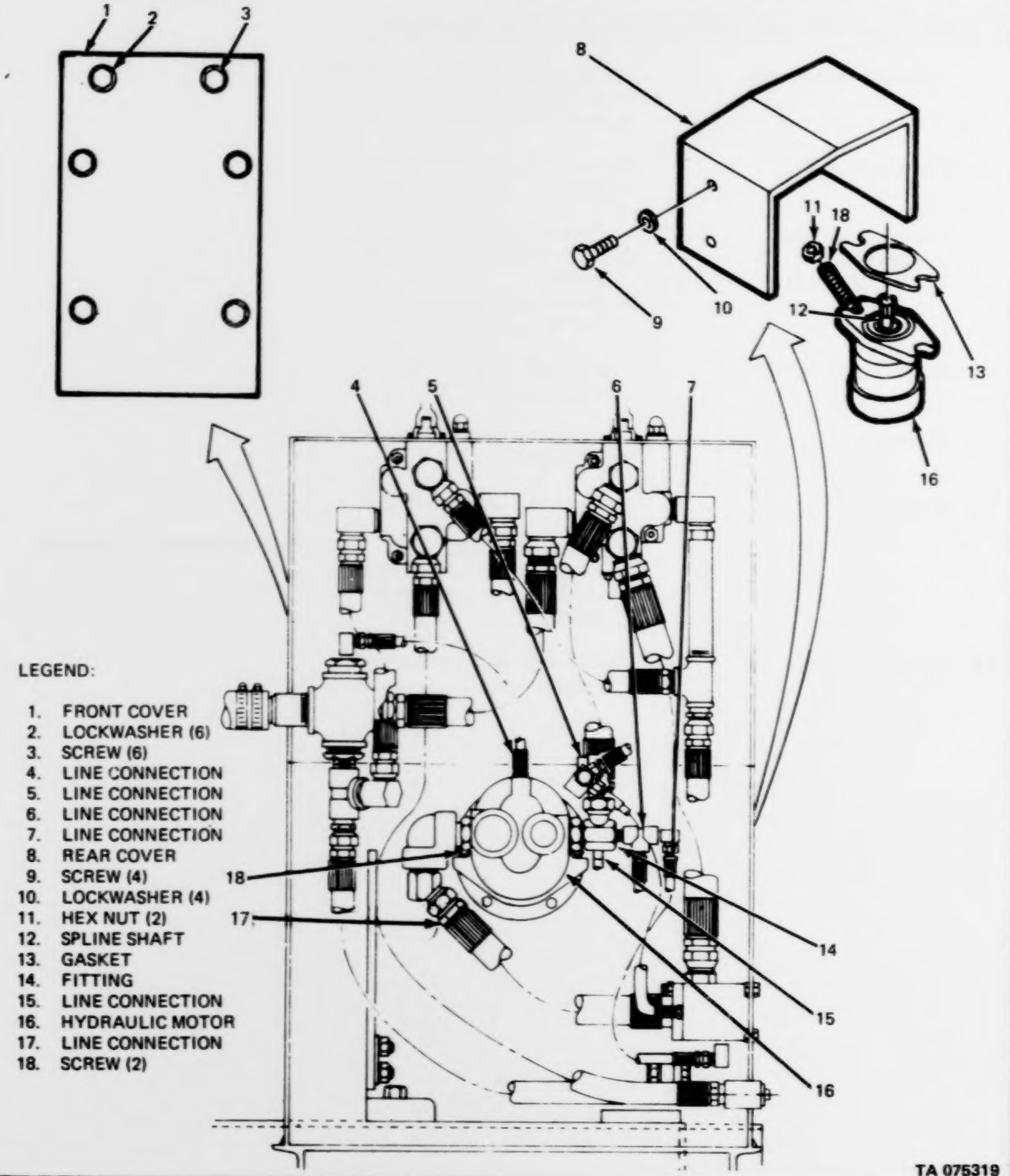
WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing reservoir fill cap.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Six screws (3) and lockwashers (2).	Unscrew and remove winch front cover (1).	
2. Four screws (9) and lockwashers (10).	Unscrew and remove winch rear cover (8).	
3. Five hydraulic line connections: (4), (5), (6), (7), and (17).	Unscrew from hydraulic motor (16) and plug connections.	
4. Two screws (18) and hex nuts (11).	Unscrew and pull hydraulic motor (16) straight out from failsafe brake.	
5. Gasket (13).	Discard.	
B. CLEANING AND INSPECTION.		
6. Hose fittings at connections (4), (5), (6), (7), and (17).	Wipe clean and inspect for crossed threads, burrs, and cracked hoses.	Replace fitting as necessary.
7. Motor spline shaft (12).	Wipe clean and inspect for gouges, chips, and broken splines.	Refer to Direct Support/General Support Maintenance if shaft splines or spline sleeve on failsafe brake are damaged.
C. INSTALLATION AND OPERATIONAL CHECK.		
8 New gasket (13).	Coat both sides with silastic gasket sealer and place on flange of hydraulic motor (16).	
9. Two screws (18).	Position in flange slots of hydraulic motor (16).	

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FRONT COVER
2. LOCKWASHER (6)
3. SCREW (6)
4. LINE CONNECTION
5. LINE CONNECTION
6. LINE CONNECTION
7. LINE CONNECTION
8. REAR COVER
9. SCREW (4)
10. LOCKWASHER (4)
11. HEX NUT (2)
12. SPLINE SHAFT
13. GASKET
14. FITTING
15. LINE CONNECTION
16. HYDRAULIC MOTOR
17. LINE CONNECTION
18. SCREW (2)

TA 075319

WINCH.

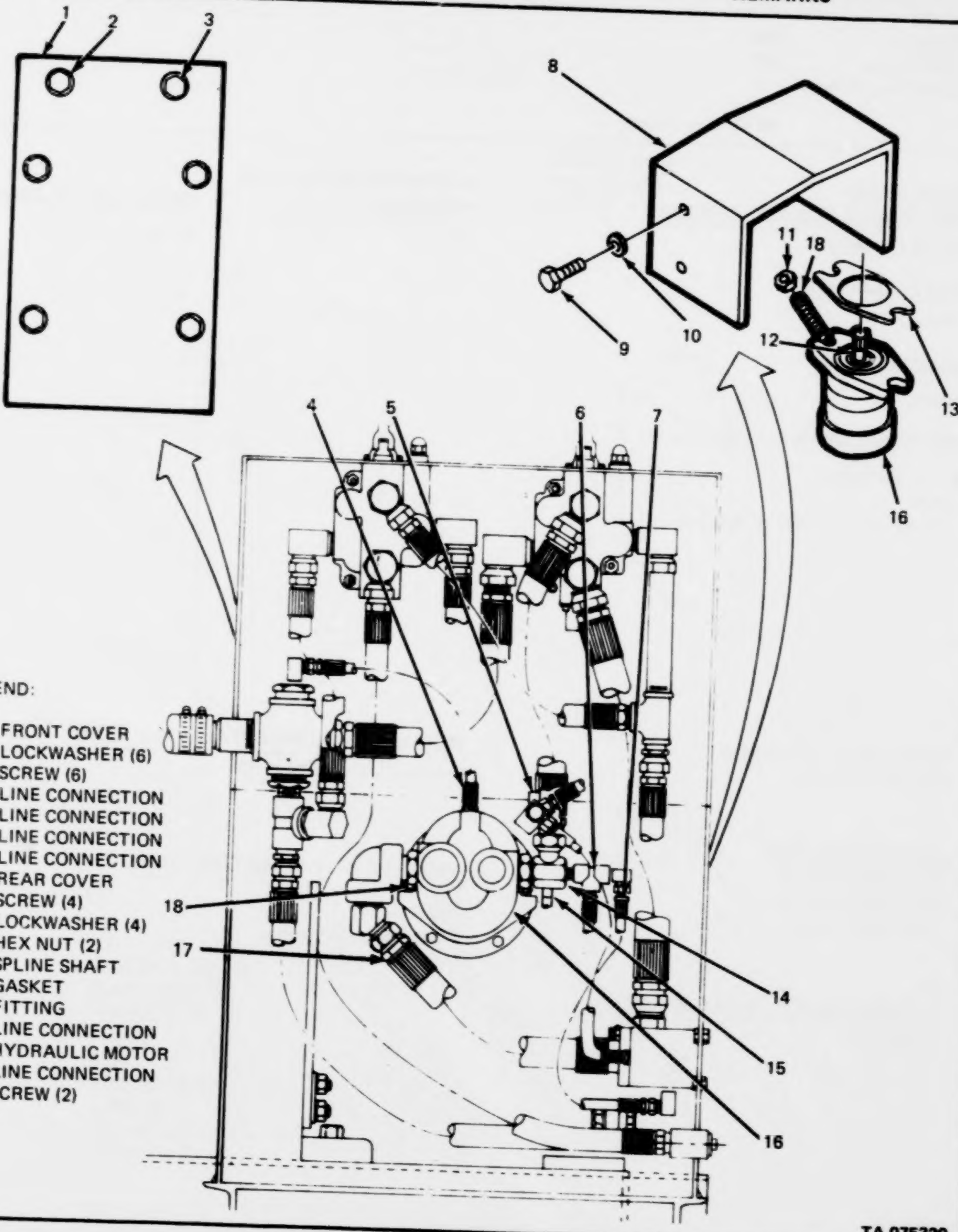
12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).

C. INSTALLATION AND OPERATIONAL CHECK (Continued).

LOCATION/ITEM	ACTION	REMARKS
10. Hydraulic motor (16).	Aline capscrews (18) and spline shaft (12); push into position against failsafe brake.	
11. Two hex nuts (11).	Screw on to screws (18) and tighten.	
12. Five hydraulic line connections: (4), (5), (6), (7), and (17).	a. Remove plugs. b. Coat threads with liquid teflon. c. Install and tighten as illustrated.	
13. Winch rear cover (8).	Install with four screws (9) and lockwashers (10).	
14. Engine.	Start up and engage PTO (see TM 9-2320-273-10).	
15. Winch.	Engage (see TM 9-2320-273-10). a. Check for leaks. b. Disconnect PTO and shut down engine (see TM 9-2320-273-10).	 Tighten fittings as necessary.
16. Winch front cover (1).	Install with six lockwashers (2) and screws (3).	

12-14. HYDRAULIC MOTOR MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FRONT COVER
2. LOCKWASHER (6)
3. SCREW (6)
4. LINE CONNECTION
5. LINE CONNECTION
6. LINE CONNECTION
7. LINE CONNECTION
8. REAR COVER
9. SCREW (4)
10. LOCKWASHER (4)
11. HEX NUT (2)
12. SPLINE SHAFT
13. GASKET
14. FITTING
15. LINE CONNECTION
16. HYDRAULIC MOTOR
17. LINE CONNECTION
18. SCREW (2)

TA 075320

WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(20)
c. Operational Check.	(5)
	45 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 and M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Clean Container.
Plugs.
Liquid Teflon (Refer to Appendix C).

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.
TM 9-2320-273-20P.
LO 9-2320-273-12.

TROUBLESHOOTING REFERENCES

Table 12-1.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

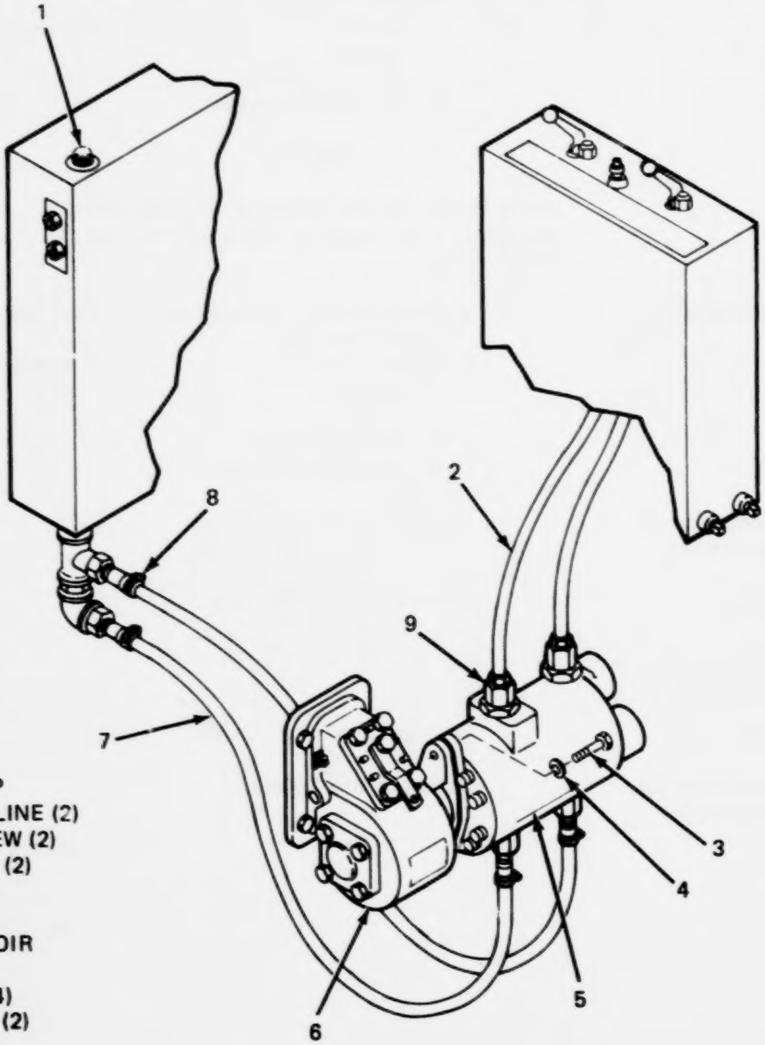
Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS

WARNING

Winch system retains some pressure even when not in use. Before you begin maintenance, vent pressure by carefully removing fill cap (1).



LEGEND:

1. FILL CAP
2. MOTOR LINE (2)
3. CAPSCREW (2)
4. WASHER (2)
5. PUMP
6. PTO
7. RESERVOIR LINE (2)
8. CLAMP (4)
9. FITTING (2)

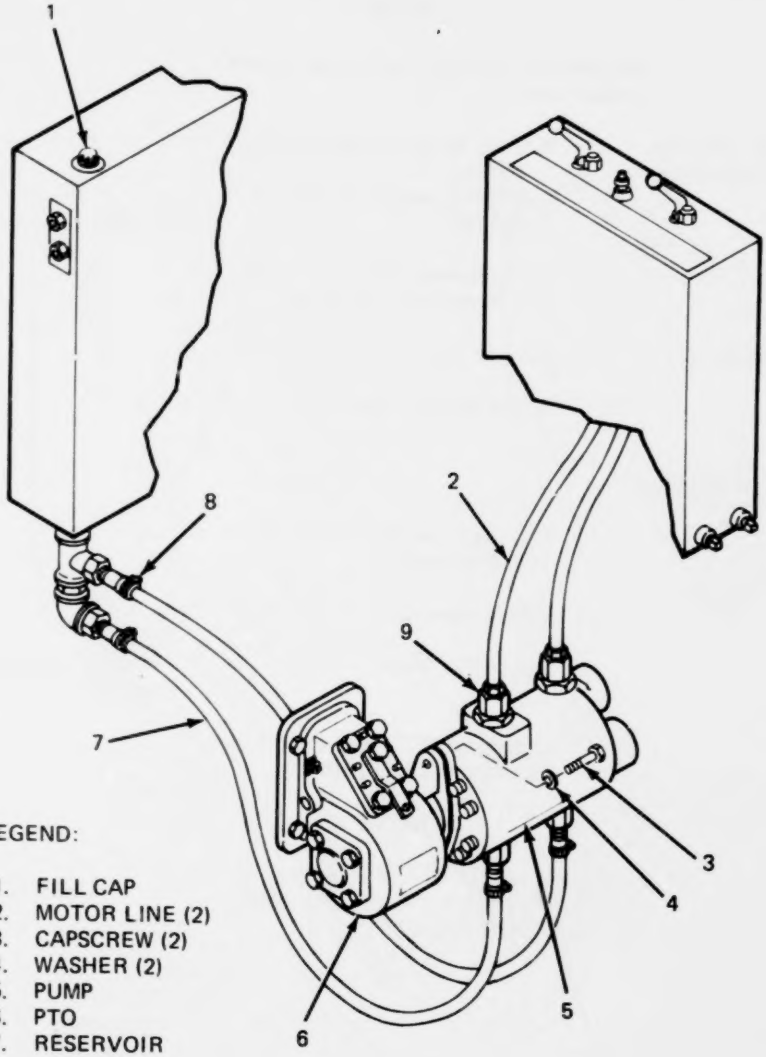
TA 075321

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
	NOTE Plug each line as soon as you have disonnected it. This will prevent loss of fluid from system. As an alternate the reservoir may be drained.	
1. Four clamps (8).	a. Unscrew and remove two reservoir lines (7).	Plug lines as removed.
	b. Inspect for: 1. Cracks. 2. Leaks. 3. Discoloration. 4. Damaged fittings.	Replace if necessary.
	NOTE Before you unscrew motor lines, place clean container underneath to catch oil draining from pump.	
2. Two fittings (9).	a. Unscrew and remove two motor lines (2).	Plug lines as removed.
	b. Inspect for: 1. Cracks. 2. Leaks. 3. Discoloration. 4. Damaged fittings.	Replace if necessary.
3. Two capscrews (3) and washers (4).	Unscrew and remove.	
4. Pump (5).	Remove from PTO (6).	
B. INSTALLATION.		
5. Pump (5).	Position against PTO (6).	
6. Two capscrews (3). and washers (4).	Screw in and tighten.	

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FILL CAP
2. MOTOR LINE (2)
3. CAPSCREW (2)
4. WASHER (2)
5. PUMP
6. PTO
7. RESERVOIR LINE (2)
8. CLAMP (4)
9. FITTING (2)

TA 075322

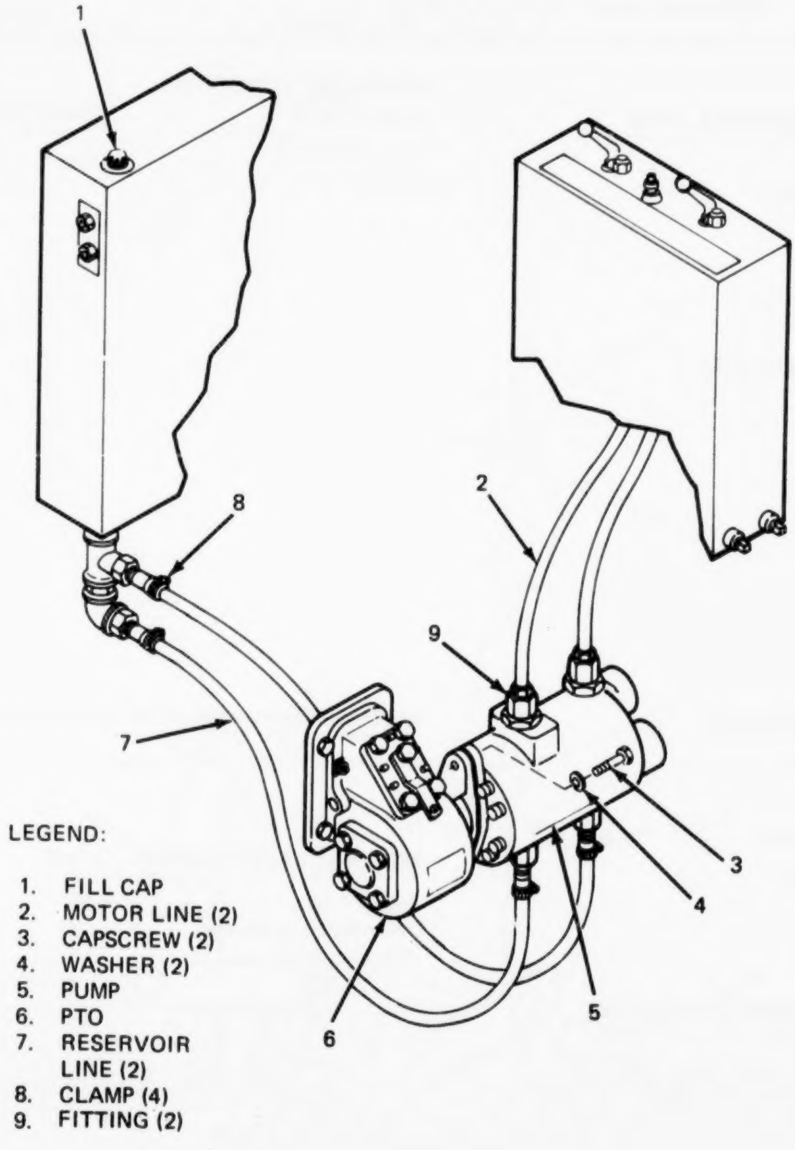
WINCH.

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
B. INSTALLATION (Continued).		
	NOTE Be sure you connect each hose to the proper port.	
7. Two fittings (9) with two motor lines (2) attached.	a. Coat threads with liquid teflon. b. Unplug, screw in, and tighten.	
8. Pump (5).	Using funnel, pour oil from container into top ports.	
9. Two reservoir lines (7).	Attach with four clamps (8).	
10. Fill cap (1).	Screw on and tighten.	
C. OPERATIONAL CHECK.		
11. Engine.	Start up (see TM 9-2320-273-10). Engage PTO.	
12. Winch.	Check operation.	
13. Pump (5).	Check for leaks.	Retighten connections as necessary.
14. Engine.	Disengage PTO and shut down (see TM 9-2320-273-10).	
	NOTE Use sight glasses to check oil level in reservoir. Add oil if necessary (refer to LO 9-2320-273-12).	

12-15. HYDRAULIC PUMP MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. FILL CAP
2. MOTOR LINE (2)
3. CAPSCREW (2)
4. WASHER (2)
5. PUMP
6. PTO
7. RESERVOIR LINE (2)
8. CLAMP (4)
9. FITTING (2)

TA 075323

WINCH.

12-16. PTO LINKAGE MAINTENANCE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(20)
b. Installation.	(25)
c. Operational Check.	(5)
	50 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

M916 Thru M920.

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

None.

EQUIPMENT CONDITION PARAGRAPH	CONDITION DESCRIPTION
None.	None.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-10.

TROUBLESHOOTING REFERENCES

Table 12-1, 12-2.

SPECIAL ENVIRONMENTAL CONDITIONS

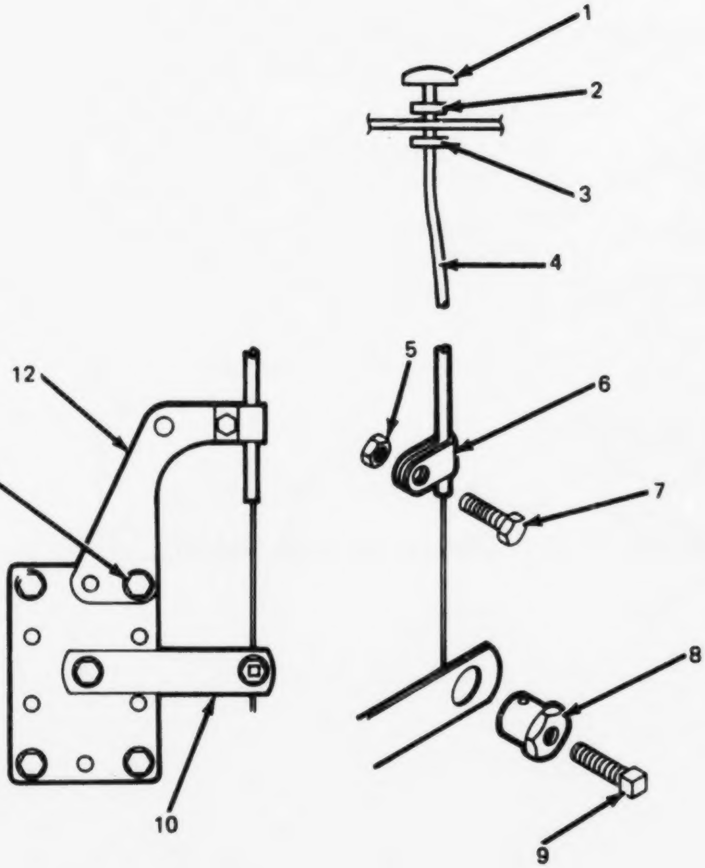
Vehicle Parked on Level Ground.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Park Brake Set.

12-16. PTO LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Screw (9) and retaining nut (8).	Loosen.	
2. Capscrew (11).	Remove.	
3. Bracket (12).	Remove.	



LEGEND:

1. KNOB
2. LOCKNUT
3. LOCKNUT
4. CABLE
5. NUT
6. CLAMP
7. CAPSCREW
8. RETAINING NUT
9. SCREW
10. PTO ARM
11. CAPSCREW
12. BRACKET

TA 075324

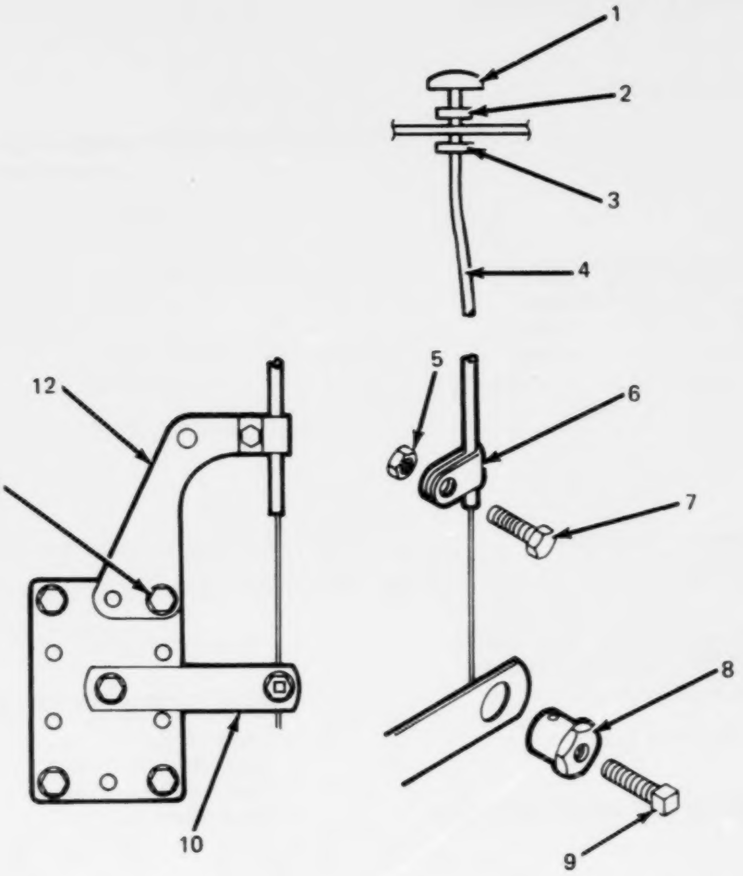
12-16. PTO LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL (Continued).		
4. Capscrew (7) and nut (5).	Remove.	
5. Clamp (6).	Remove.	
6. Knob (1).	Remove.	
7. Locknut (2) and (3).	Remove.	
8. Cable (4).	Remove and inspect for kinks or breaks.	
B. INSTALLATION.		
9. Cable (4).	Secure with locknuts (2), and (3).	
10. Knob (1).	Install.	
11. Clamp (6).	Secure with capscrew (7) and nut (5).	
12. Cable (4).	Secure at PTO arm (10) by running thru hole in retaining nut (8) and tightening screw (9).	
13. Bracket (12).	Secure with capscrew (11).	
C. OPERATIONAL CHECK.		
14. Start engine.	(Refer to TM 9-2320-273-10.)	
15. Check PTO operation.	(Refer to TM 9-2320-273-10.)	

WINCH.

12-16. PTO LINKAGE MAINTENANCE (Continued).

LOCATION/ITEM	ACTION	REMARKS



LEGEND:

1. KNOB
2. LOCKNUT
3. LOCKNUT
4. CABLE
5. NUT
6. CLAMP
7. CAPSCREW
8. RETAINING NUT
9. SCREW
10. PTO ARM
11. CAPSCREW
12. BRACKET

TA 075325

WINCH.

12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.

THIS TASK COVERS: (APPROXIMATE TIME REQUIRED FOLLOWS TASK DESCRIPTION.)

a. Removal.	(0.4)
b. Installation.	(0.4)
c. Operational Check.	(0.2)
	1.0 Minutes Total.

INITIAL SETUP

APPLICABLE CONFIGURATIONS

All

TEST EQUIPMENT

None.

SPECIAL TOOLS

None.

MATERIALS/PARTS (P/N)

Bushing, MS51847-1 (96906).
Bushing, MS51847-9 (96906).
Drain Cock, 7-2177-4 (86768).
Tape, Antiseizing Item 14, Appendix C.

PERSONNEL REQUIRED

One (MOS-63B20).

REFERENCES (TM)

TM 9-2320-273-20P.

TROUBLESHOOTING REFERENCES

None.

EQUIPMENT CONDITION

PARAGRAPH	CONDITION DESCRIPTION
None.	None.

SPECIAL ENVIRONMENTAL CONDITIONS

Work Area Clean and Away from Blowing Dirt and Dust.

GENERAL SAFETY INSTRUCTIONS

Engine OFF.
Transmission in Neutral.
Vehicle on Level Ground.
Wheels Blocked.

WINCH.

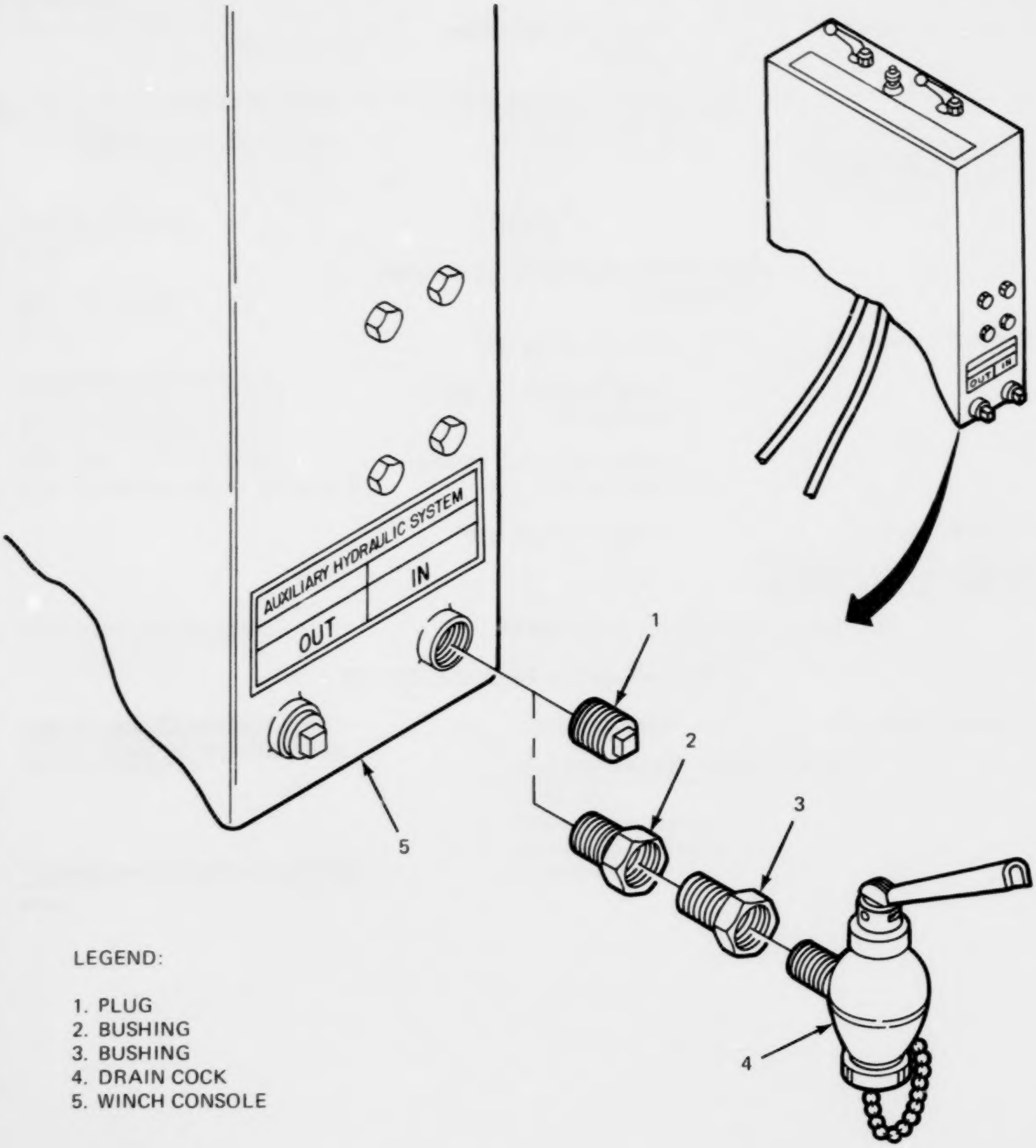
12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.

LOCATION/ITEM	ACTION	REMARKS
A. REMOVAL.		
1. Winch Console (5).	Place drain pan under plug (1).	
2.	Remove and discard plug (1).	Allow oil to drain.
B. INSTALLATION.		
	NOTE Apply antiseizing tape to all threaded connections.	
3. Winch Console (5).	Install bushing (2).	
4.	Install bushing (3) into bushing (2).	
5.	Install drain cock (4) into bushing (3).	
6. Winch reservoir.	Refill to proper level.	
C. OPERATIONAL CHECK.		
	NOTE Start engine (see TM 9-2320-273-10).	
7. Winch Console (5).	Operate winch.	Check bushings (2) and (3) and drain cock (4) for leaks.

WINCH.

12-17. TAKING HYDRAULIC SYSTEM OIL SAMPLE.

LOCATION/ITEM	ACTION	REMARKS


AUXILIARY HYDRAULIC SYSTEM
OUT
IN
1
2
3
4
5

LEGEND:

1. PLUG
2. BUSHING
3. BUSHING
4. DRAIN COCK
5. WINCH CONSOLE

TA 237250

APPENDIX A

REFERENCES

A-1. PUBLICATION INDEXES.

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Index of Army Motion Pictures and Related Audio-Visual Aids	DA PAM 108-1
Consolidated Index of Army Publications and Blank Forms	DA PAM 310-1

A-2. FORMS.

The following forms pertain to this material. (Refer to DA Pamphlet 310-2 for index of blank forms.)

Standard Form 46, U.S. Government Motor Vehicle Operator's Identification Card.

Standard Form 91, Operator's Report of Motor Vehicle Accident.

DA Form 2028, Recommended Changes to Publications and Blank Forms.

Refer to DA PAM 738-750, The Army Maintenance Management Systems (TAMMS), for instructions on the use of maintenance forms pertaining to this material.

A-3. OTHER PUBLICATIONS.

The following publications contain information pertinent to the major item materiel and associated equipment.

a. Operating Vehicle

Operator's Manual for M915, M916, and M920 Truck Tractors and Chassis for M917, M918, and M919	TM 9-2320-273-10

A-3. OTHER PUBLICATIONS (Continued).

Army Motor Transport: Units and Operations.	FM 55-30
Manual for the Wheeled Vehicle Driver	FM 21-305
Prevention of Motor Vehicle Accidents.	AR 385-55
Accident Reporting and Records.	AR 385-40

b. Maintenance and Repair

Organizational Maintenance for M915, M916, and M920 Truck Tractors and Chassis for M917, M918, and M919	TM 9-2320-273-20
Organizational Maintenance Repair Parts and Special Tools List for M915, M916, and M920 Truck Tractors and Chassis for M917, M918, and M919	TM 9-2320-273-20P
Lubrication Order for M915, M916, and M920 Truck Tractors and Chassis for M917, M918, and M919	LO 9-2320-273-12
Direct Support and General Support Repair Parts and Special Tools List for M915, M916, and M920 Truck Tractors and Chassis for M917, M918, and M919	TM 9-2320-273-34P
Organizational Care, Maintenance and Repair of Pneumatic Tires and Inner Tubes	TM 9-2610-200-24
Description, Use, Bonding Techniques, and Properties of Adhesives	TB ORD 1032
Materiels Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals.	TM 9-247
Metal Body Repair and Related Operations.	FM 43-2
Welding Theory and Application.	TM 9-237
Painting Instructions for Field Use	TM 43-0139
Inspection, Care, and Maintenance of Anti-friction Bearings.	TM 9-214
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems	TB 750-651

A-3. OTHER PUBLICATIONS (Continued).

Cooling Systems: Tactical Vehicles	TM 750-254
Functional Grouping Codes	TB 750-93-1

c. Cold Weather Operation and Maintenance

Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71
Operation and Maintenance of Ordnance Materiel in Extreme Cold Weather (0^{o}F to -65^{o}F)	FM 9-207
Winterization Kits for Army Tank-Automotive Materiel	SB 9-16

d. Decontamination

Chemical, Biological, and Radiological (CBR) Decontamination	TM 3-220
Chemical, Biological, Radiological, and Nuclear Defense	FM 21-40

e. Truck Bodies

Organizational, Direct Support and General Support Maintenance Manual for M917 Dump Truck Body	TM 5-3805-274-24&P
Organizational, Direct Support and General Support Maintenance Manual for M918 Bituminous Distributor Truck Body	TM5-3895-371-24&P
Organizational Maintenance Manual for M919 Concrete-Mobile®Mixer Truck Body	TM 5-3895-372-20
Direct Support and General Support Maintenance Manual For M919 Concrete-Mobile®Mixer Truck Body	TM 5-3895-372-34

f. General

Principles of Automotive Vehicles	TM 9-8000
Comouflage	FM 5-20
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use	TM 750-244-6
Administrative Storage of Equipment	TM 740-90-1
Color, Marking and Camouflage Painting of Military Vehicles	TB 43-0209
Preservation, Packaging, and Packing of Military Supplies and Equipment	TM 38-230-1 & TM 38-230-2
Shipment and Limited Storage	MIL-V-62038
Storage Serviceability Standard: Tracked Vehicles, Wheeled Vehicles, and Component Parts	SB 740-98-1

g. Warranty	TB 9-2300-295-15/17

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition; i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly or module (component or assembly) for an unserviceable counterpart.

B-2. MAINTENANCE FUNCTIONS (Continued).

i. Repair. The application of maintenance services[1] or other maintenance actions[2] to repair serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/ components.

B-3. COLUMN ENTRIES USED IN THE MAC.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a "work time" figure in the appropriate sub-column(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate "work time" figures will be shown for each level. The number of manhours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C – Operator or crew

O – Organizational maintenance

F – Direct Support maintenance

H – General Support maintenance

D – Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

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[1] Services – Inspect, test, service, adjust, aline, calibrate, or replace.

[2] Action – Welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

B-3. COLUMN ENTRIES USED IN THE MAC (Continued).

f. Column 6, Remarks. This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in section IV.

B-4. COLUMN ENTRIES USED IN TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN SECTION IV.

a. Reference Code. The code scheme recorded in column 6, section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed as indicated on the MAC, section II.

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919.

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE	Repair			19.2			2-3-4	
		Adjust			3.8				
		Test			0.4				
0100	Engine (Diesel)	Service	2.0						
		Replace			11.0				
		Repair				65.0		1 thru 77-81-84-85-97 99 thru 180-189 thru 221	
	Engine Mount	Inspect		0.2					
		Replace			0.4				
0101	Cylinder Head	Inspect			1.0				
		Replace			7.0				
		Repair			10.4			2 thru 44-50-81	
	Engine Block	Inspect				2.0			
		Repair				40.0		99 thru 116-128-129	
	Cylinder and Sleeve Assembly	Inspect			0.5				
		Replace				18.0		99 thru 101-128	
0102	Crankshaft & Main Bearings	Inspect				0.5			
		Replace				17.3		117 thru 119	
	Main Seals	Inspect			0.1				
		Replace			20.0			120 thru 127-194-195	
	Vibration Damper	Inspect			0.5				
		Replace			1.0				
0103	Flywheel Assembly	Replace			13.0			45	
0104	Connecting Rods, Bearings and Pistons Assembly	Inspect				0.3			
		Replace				27.0		207 thru 215-221	
		Repair				8.0			
0105	Valves	Inspect			0.8				
		Adjust			1.8			71 thru 77	
		Replace			14.0			2	
	Cam Shaft and Bearing	Inspect				0.8			
		Replace				27.0		197 thru 206	
	Cam Follower Housing	Inspect				0.2			
		Replace				12.0		46 thru 49-51 thru 54-81	
	Cam Follower	Inspect				0.2			
		Replace				14.0			
	Push Tubes (Valve)	Inspect				0.1			
		Replace				8.0			

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE (Continued)								
	Timing Gear	Inspect				0.6			
		Replace				24.0			
	Rocker Arm Assembly	Inspect			0.6				
		Replace			2.5				
	Valve Cover and Gasket	Inspect		0.1					
		Replace		0.5					
0106	Oil Pump	Inspect			1.5				
		Replace			2.5				
		Repair				3.0			
	Oil Filter	Service		0.6					
		Replace		0.2				130 thru 132-	
	Oil Filter Adapter	Replace			0.8			143	
	Bypass Oil Filter	Service		0.6					
		Replace		0.6					
	Oil Pan	Inspect	0.1						
		Replace			2.0				
		Repair			1.3				
	External Lines	Inspect		0.1					
		Replace		1.0					
	Oil Breather	Inspect		0.1					
		Service		0.2					
		Replace		0.2					
	Oil Cooler	Inspect		0.1					
		Replace			3.0			55	
	Oil Pressure Regulator	Inspect			0.1				
		Test			0.8				
		Replace			0.2				
	Level Gage (dipstick)	Replace		0.1					
0108	Aftercooler	Inspect		0.1					
		Repair			2.0				
		Replace			2.5				
	Exhaust Manifold	Inspect		0.1					
		Replace			2.8				
0109	Accessory Drive	Inspect			0.5				
		Repair			2.0				
		Replace			4.5			56 thru 65	

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	ENGINE (Continued)								
0112	Engine Retarder	Inspect		0.5					
		Repair				6.0		81	
		Replace			3.0				
		Adjust			1.5				
03	FUEL SYSTEM								
0301	Fuel Injector Assembly	Test			0.8				
		Adjust			4.0			71 thru 77- 84	
		Replace			4.0				
		Calibrate				1.0		3 thru 12-84- 152	
		Repair				1.8		151 thru 154- 166 thru 171- 188	
0302	Fuel Pump Assembly Service of Filter & Screw	Inspect		0.5					
		Service		0.2					
		Test			4.8			144 thru 150	
		Replace			2.0			196	
		Calibrate				3.5		159 160 166 thru 171 174 192	
		Repair				8.9		155-156 158 161 thru 164 165-172-173 177 thru 179 189 thru 191 193 216 thru 220	
0302	Engine Fuel Lines and Fittings	Inspect		0.5					
		Replace		1.5					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
03	FUEL SYSTEM (Continued)								
0304	Air Cleaner Assembly	Inspect	0.1						
		Service		0.2					
		Replace		0.5					
	Air Cleaner Restriction Indicator	Inspect	0.1						
		Replace		0.2					
0305	Turbocharger	Inspect	0.1						
		Replace			1.8				
		Repair				3.0		175-176-219	
	Turbocharger Air Inlet	Inspect		0.1					
		Replace		0.3					
0306	Fuel Tank	Inspect	0.1						
		Service	0.2						
		Repair			1.5				
		Replace		2.0					
0309	Fuel Filter	Inspect	0.1						
		Service		0.3					
		Replace		0.3					
0311	Ether Quick-Start Kit	Inspect	0.1						
		Service		0.3					
		Replace		0.5					
		Repair		0.5					
0312	Accelerator Pedal and Linkage	Inspect		0.1					
		Replace		0.8					
		Repair		0.5					
	Throttle Control and Linkage	Inspect		1.0					
		Replace		0.3					
		Adjust		0.2					
04	EXHAUST SYSTEM								
	Muffler	Inspect	0.1						
		Replace		0.5					
	Exhaust Pipe	Inspect	0.1						
		Replace		0.4					
	Flex Tube	Inspect	0.1						
		Replace		0.4					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
04	EXHAUST SYSTEM (Continued)								
	Extension Tube	Inspect	0.1						
		Replace		0.4					
	Tailpipe	Inspect	0.1						
		Replace		0.2					
05	COOLING SYSTEM								
0501	Draincock	Inspect	0.1						
		Replace		0.2					
	Radiator Assembly	Inspect	0.2						
		Service	0.2						
		Replace		3.0					
		Repair			2.0				
		Test			0.3				
0502	Fan Shrouds	Inspect		0.1					
		Replace		1.5					
0503	Lines, Fittings, Hoses	Inspect	0.1						
		Replace		2.5					
	Thermostat	Replace		1.0				97	
	Thermostat Housing	Replace		1.0					
	Water Manifold	Replace		2.0					
		Repair		2.0					
	Water Control Valve	Inspect		0.2					
		Replace		0.4					
0504	Water Pump	Inspect	0.1						
		Replace		3.0					
		Repair			2.0			56 thru 70	
0505	Fan	Inspect	0.1						
		Replace		0.5					
	Fan Clutch	Inspect	0.1						
		Replace		1.5					
	Water Pump Idler Pulley	Replace		0.5					
	Crankshaft Pulley	Replace		0.1					
	Accessory Drive Belts	Inspect		0.2					
		Adjust		0.2					
		Replace		1.0					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
05	COOLING SYSTEM (Continued)								
0507	Fan Clutch Actuator	Inspect	0.2						
		Replace		0.5					
	Fan Clutch Actuator Hoses	Inspect	0.1						
		Replace		0.5					
06	ELECTRICAL SYSTEM								
0601	Alternator & Regulator (Internal)	Inspect	0.2						
		Replace		1.0					
		Adjust			0.5				
		Test			0.5				
		Repair			2.0			78-79	
	Alternator Drive Belts	Inspect	0.1						
		Adjust		0.1					
		Replace		0.3					
0603	Starter Motor/Solenoid	Replace		0.9					
		Repair			1.8			80	
	Starter Magnetic Switch	Inspect	0.1						
		Replace		0.5					
0607	Instruments – LH Cluster	Replace		0.5					
0608	Engine Run Switch	Replace		0.5					
	Start Switch	Replace		0.5					
	Ether Quick-Start Button	Replace		0.5					
	Clearance Lamp	Replace		0.5					
	Headlight	Replace		0.5					
	Blackout Switch	Replace		0.5					
	Engine Retarder Selector Switch	Replace		0.5					
	Engine Retarder Foot Switch	Replace		0.5					
	Turn Signal Control	Replace		0.5					
	Backup Alarm Override	Replace		0.5					916/920
	Work Lamp Switch	Replace		0.5					
	Heater Fan Switch	Replace		0.5					
	Dimmer Switch	Replace		0.5					
0609	Service Head Lamps	Replace		0.6					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6)
			C	O	F	H	D		
06	ELECTRICAL SYSTEM (Continued)								
	Marker & Turn Signal Lamps	Replace		0.3					
	Clearance Lamps	Replace		0.3					
	Tail, Brake, Turn Signal, Stop, and Backup Lamps	Replace		0.3					
	Work Lamps	Replace		0.3					916 & 920
	Blackout Head Lamp	Replace		0.3					
	Blackout Tail & Stop Lamps	Replace		0.3					
	Dome Lamp & Switch	Replace		0.3					
	Instrument Illumination Lamps	Replace		0.3					
0610	Sending Units								
	Fuel Level	Replace		0.4					
	Water Temperature	Replace		0.2					
	Oil Pressure	Replace		0.2					
	Transmission Oil Temperature	Replace		0.2					
	Switches and Relays								
	High Engine Water Temperature	Replace		0.2					
	Low Engine Oil Pressure	Replace		0.2					
	Low Brake Air Pressure	Replace		0.2					
	Backup	Replace		0.2					916-920
0610	Park Brake Engaged	Replace		0.2					
	Turn Signal Flasher	Replace		0.2					
	PTO Engaged	Replace		0.2					916-920
	Neutral Safety Switch	Replace		0.2					
	Differential Lockout Engaged	Replace		0.2					
	Instrument Panel Circuit Breakers	Replace		0.2					
	Instrument Panel Relays	Replace		0.2					
0611	Horn	Replace		0.4					
	Horn Button	Replace		0.5					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
06	ELECTRICAL SYSTEM (Continued)								
	Low Air Buzzer	Replace		0.2					
	Backup Alarm	Replace		0.2					
0612	Batteries, Box & Cables								
	Batteries	Inspect	0.5						
		Replace		0.6					
	Battery Box	Inspect	0.2						
		Replace		1.5					
		Repair		1.0					
	Battery Cable	Inspect	0.2						
		Replace		0.5					
		Repair		0.3					
0613	Chassis Wiring Harnesses	Inspect	0.2						
		Replace		3.5					
		Repair		1.0					
0617	Trailer Coupling (Electric)	Inspect	0.2						
		Replace		0.2					
07	TRANSMISSION								
0706	Ratio Selector	Inspect	0.1						
		Adjust				0.7			
		Replace		0.3					
		Test		0.6					
		Repair				2.0			
	Air Control Line	Replace		0.5					
	Control Group	Inspect	0.3						
		Adjust				0.5			
		Replace			2.3				
		Test				1.0			
		Repair				2.5			
0710	Transmission	Inspect	0.1						
		Service		2.0					Includes Strainer
		Replace			8.0				
		Repair			4.0	22.0		183 thru 185	
	Pump, Oil	Inspect			0.2				
	Oil Cooler	Inspect		0.2					
		Replace		0.1					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
08	POWER TRANSFER								
0801	Transfer Assembly	Inspect	0.1						
		Service		0.5					
		Replace			4.0				
		Repair			3.0				
0803	Power Transfer/Diff. Lockout Control	Replace		0.5					
09	PROPELLER SHAFTS & UNIVERSAL JOINTS								
	Universal Joints	Inspect		0.3					
		Service		0.2					
		Replace		1.4					
	Propeller Shafts	Inspect		0.3					
		Service		0.2					
		Replace		1.0					
10	FRONT AXLE								
1000	Driving Axle Assembly	Inspect	0.2						
		Service		1.0					M916 thru M920
		Replace			6.0				
		Repair				40.0			
	Non-Driving Axle Assembly	Inspect	0.1						
		Service		0.3					M915 only
		Repair			6.0				
		Replace			4.0				
	Bearings, Axle Shaft and Flanges	Inspect	0.1						
		Replace		4.0		10.0		98	
1002	Differential Assembly	Replace			4.5				M916 thru M920
		Repair			8.0				
		Overhaul				17.5			
1004	Front Axle End Assembly	Inspect	0.5						M915 only
		Replace		2.0					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
11	REAR AXLE								
1100	Rear Bogie Axle	Inspect	0.1						M915 only (include filter)
		Service		0.7					
		Replace			4.0				
		Repair			4.0				
		Overhaul				17.5			
	Rear Axle Housing	Inspect	0.1						M916 thru M920
		Replace			10.0				

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
11	REAR AXLE (Continued)								
1102	Differential and Carrier	Replace			9.8				
		Repair			9.8				
		Overhaul				11.8			
	Filter	Inspect	0.1						
		Replace		0.2					
	Flange, Companion Drive Pinion	Inspect	0.1						
		Replace			1.0			87-88-90 thru 95-186-187	
	Seal, Oil, Drive Pinion Bearing	Inspect	0.1						
		Replace			1.5				
1104	Rear Axle Shaft, Right or Left	Replace		3.5					
1105	Differential Lockout Air Chamber	Repair			1.0				
		Replace			1.0				
1108	Pusher Axle	Inspect	0.1						M917, M919 & M920
		Service		2.0					
		Replace			6.0				
		Repair			6.0				
1108	Air Bags	Replace		1.0					
	Lift Cylinders	Replace		1.0					
12	BRAKES								
1201	Park Brake Assembly	Inspect	0.1						
		Adjust		0.5					
		Repair			0.8				
		Replace		1.4					
1202	Foundation Brakes								
	Brake Shoe Assemblies	Inspect		1.0					
		Adjust		0.5					Rear Only
		Repair			3.5				
		Replace		3.0					Includes Shoe Spring
	Slack Adjuster	Replace		0.3					Rear Only
	S-Cam Mechanism	Replace		3.0					Rear Only

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
12	BRAKES (Continued)								
1208	Air Lines and Fittings (Truck Tractor)	Inspect	0.1						
		Replace		2.2					Individual Lines
	Air Reservoirs	Inspect	0.2						
		Service	0.1						
		Replace		1.1					
	Automatic Drain	Replace		0.2					Supply Reservoir Only
1208	Air Brake Chambers	Adjust		0.2					Spring Brake Chamber Only
		Replace		2.0					
		Repair		2.2					
	Double Brake Chambers	Adjust		0.2					
		Replace		2.0					
		Repair			2.2				
	Wedge and Actuator Housing Assemblies	Replace		2.0					Front and Pusher Axle Only
1208	Trailer Hand Brake	Inspect	0.1						Spring Brake Chamber only
		Replace		1.8					
		Repair		1.5					
	Dual Brake Valve and Pedal	Replace		1.5					
	Trailer Protection Valve	Replace		1.5					
	Relay Valve	Replace		1.5					
	Quick Release	Replace		1.5					
	Limiting Valve	Replace		1.5					
	Double Check Valves	Replace		1.5					
1209	Air Compressor	Replace			4.0				
		Repair			2.0			85-177 thru 180-219	
	Air Compressor Governor	Adjust			1.0				
		Replace			0.5				
	Air Dryer	Inspect	0.1						
		Service	0.2	1.5					
		Replace		0.8					
1211	Trailer Connector Brake Lines and Couplings	Inspect	0.1						
		Replace		1.0					
		Repair			1.3				

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
13	WHEELS								
1300	Wheel Alinement	Inspect		0.8					
		Adjust		0.5					
1311	Hub Assemblies	Replace		0.5					
	Drums	Replace		1.5					
		Repair			1.5				
	Bearings and Seals	Service		1.5					Inner and Outer Bearings and Seals
		Replace		1.5				82-83-96-98	
	Wheel Assembly	Inspect	0.1						Include Tire
		Replace	0.5						
		Service	0.1						
1313	Tire and Tube Assembly	Replace		2.1					
		Repair		1.3					
14	STEERING								
1401	Steering Wheel	Inspect	0.1						
		Replace		0.5					
	Upper Steering Column	Replace			3.0				
		Repair			3.5				
	Lower Steering Column	Replace		1.0					
		Repair		0.5					
	Drag Links	Inspect	0.1						
		Adjust		0.3					
		Replace		1.0					
		Repair		1.5					
	Pitman Arm	Replace		0.8					
	Tie Rod	Inspect	0.1						
		Adjust		1.0					
		Replace		1.5					
		Repair		1.0					
1410	Steering Gear	Adjust			0.2				
		Replace			1.5				
		Repair				2.0			

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
14	STEERING (Continued)								
	Hydraulic Steering Pump and Reservoir Assembly	Inspect	0.1						
		Service	0.2						
		Replace		1.0					
		Repair				2.0			
1411	Power Steering Cylinder	Inspect	0.1						
		Replace		2.0					916-920
		Repair			1.5				
15	FRAME ASSEMBLY								
1501	Frame	Inspect	0.5						
	Bumper	Replace		1.0					
1503	Pintle Hook Assembly	Inspect	0.1						
		Replace		0.6					
		Repair		0.2					
1503	Towing Eyes	Inspect	0.1						
		Replace		0.5					
1504	Spare Wheel Carrier	Replace			1.5				
1506	Fifth Wheel								
	Fifth Wheel Assembly	Inspect	0.5						
		Adjust		1.0					
		Service		0.5				181 182	M915, M916 and M920
		Repair				3.0			
		Replace		4.0					
16	SPRINGS, SHOCK ABSORBERS, AND TORQUE RODS								
1601	Springs	Inspect	0.1						
		Service		0.2					
		Replace			4.0				
		Repair			6.0				
	Front Spring Pins	Replace		0.1					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued)

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
16	SPRINGS, SHOCK ABSORBERS, AND TORQUE RODS (Continued)								
1604	Shock Absorbers	Inspect	0.1						Non-Driving Front Axle (M915) and Pusher Axle (M917, M919 and M920)
		Replace		1.0					
1605	Torque Rods	Replace		1.0					
18	CAB AND BODY								
1801	Cab Mounts	Inspect	0.1						
		Replace			1.0				
	Cab	Inspect	0.1						
	Doors	Inspect	0.1						
		Replace			2.0				
		Repair			1.0				
1801	Steps	Inspect	0.1						
		Repair			1.0				
	Hood Panels and Crossbar Support	Inspect	0.1						
		Replace				0.5			
		Repair				0.2			
	Ventilators & Control	Inspect	0.1						
		Replace		0.2					
		Repair		0.5					
	Grille	Inspect	0.1						
		Replace		0.5					
		Repair		0.5					
	Splash Shields	Inspect	0.1						
		Replace		0.3					
1802	Fenders	Inspect	0.1						
		Replace		1.0	1.5				
		Repair		1.5					
	Windshield	Inspect	0.1						
		Replace			1.2			89	

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
18	CAB AND BODY (Continued)								
	Seats	Inspect	0.1						
		Replace		0.5					
		Repair			0.5				
1808	Stowage Box	Inspect	0.1						
		Replace		1.0					
		Repair		1.0					
2001	WINCH AND POWER TAKEOFF								
	Winch	Inspect	0.3						M916 and M920
		Service	0.3	0.4					
		Replace			4.0				
		Repair			8.0			86	
	Cable Assemblies	Inspect	0.2						
		Service		1.0					
		Replace		1.5					
	Controls, Valves	Replace		0.5					
	Hydraulic Lines & Fittings	Replace		2.0					
		Repair			2.0				
	Hydraulic Motor	Inspect	0.2						
		Replace		3.0					
		Repair			1.5				
	Hydraulic Pump	Inspect	0.1						
		Replace		3.0					
		Repair			1.0				
	Reservoir, In-Line Filter, and Screen	Replace		4.0					
		Service		1.0					
2004	Power Takeoff	Inspect	0.2						M916 thru M920
		Replace			1.0				
		Repair			2.0				
	Power Takeoff Adapter	Replace			1.0				
	Power Takeoff Linkage	Replace		0.8					
	Power Takeoff Coupling	Replace		0.5					

Section II MAINTENANCE ALLOCATION CHART FOR TRUCK, TRACTOR, M915, M916, AND M920 AND CHASSIS FOR M917, M918, AND M919 (Continued).

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
22	ACCESSORY ITEMS								
	Windshield Wiper Motors	Replace		0.8					
	Windshield Wiper Controls	Replace		0.3					
	Arm and Wiper Blades	Inspect	0.1						
		Replace		0.2					
	Mirrors	Inspect	0.1						
		Replace		0.3					
	Windshield Washer	Inspect	0.1						
		Service	0.2						
		Replace		0.5					
	Windshield Washer Control	Replace		0.3					
	Air Horn and Control Valve	Replace		0.3					
2207	Personnel Heater	Inspect	0.1						
		Replace		2.0					
		Repair			1.0				
	Air Ducts	Inspect	0.1						
		Replace		0.8					
	Heater Control Valve and Cable	Adjust		0.2					
		Replace		0.5					
	Heater Control Panel	Replace		1.0					
		Repair			1.0				
2210	Data and Instruction Plates	Inspect	0.1						
		Replace		0.5					
47	GAGES NON-ELECTRIC								
4701	Tachograph	Service		0.2					
		Replace		0.3					
	Speedometer Cable	Replace		0.4					
	Tachometer Cable	Replace		0.4					
4702	Pressure Gages	Inspect	0.1						
		Replace		0.5					
	Gages	Inspect	0.1						
		Replace		0.5					

Section III TOOL & TEST EQUIPMENT REQUIREMENTS.

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
1	F H	Checking Tool, Blow-By		3375150
2	F H	Reamer, Valve Guide	5110-00-980-7347	ST-646
3	F H	Cutting Tool, Bead	5110-00-932-2089	ST-788
4	F H	Expander, Tube, Roller	3441-00-922-6699	ST-880
5	F H	Cage		ST-880-1
6	F H	Roll		ST-880-2
7	F H	Nut, Thrust		ST-880-6
8	F H	Mandrel		ST-880-7
9	F H	Cutter, Injector Sleeve	4910-00-981-3105	ST-884
10	F H	Holder		ST-884-1
11	F H	Cutter		ST-884-3
12	F H	Pilot		ST-884-6
13	F H	Tool, Cylinder Head	4910-00-999-1499	ST-913
14	F H	Lockscrew		ST-913-1
15	F H	Bearing		ST-913-7
16	F H	Plug, Locking		ST-913-11
17	F H	Insert, Fiber		ST-913-18
18	F H	Screw Assembly, Adjusting		ST-913-23
19	F H	Tool Holder		ST-913-14
20	F H	Tool Bit		ST-913-17
21	F H	Tool, Grooving	5120-00-178-0948	ST-1100
22	F H	Body (5-1/2 In. Bore)		ST-1100-10
23	F H	Nut, Adjusting (1 1/4-20 Thread)		ST-1100-7
24	F H	Capscrew (1/4-28 x 3/16 In.)		ST-1100-6
25	F H	Sleeve, Rod		ST-1100-8
26	F H	Rod, Tool Adjusting		ST-1100-11
27	F H	Spring, Rod		ST-1100-9
28	F H	Cap, Tool Setting		ST-1100-14
29	F H	Cutting Tool		ST-1100-13
30	F H	Spring, Tool		ST-1100-12
31	F H	Sleeve Injector	4910-00-150-5858	ST-1140
32	F H	Holding Tool, Injector Sleeve	5120-00-104-1795	ST-1179
33	F H	Driver, Injector Sleeve	5120-00-981-3108	ST-1227
34	F H	Puller, Injector Sleeve	5120-00-113-5271	ST-1244
35	F H	Tip, Extractor		ST-1244-7
36	F H	Rod		ST-1244-2

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
37	F H	Collar, Forming		ST-1244-6
38	F H	Spacer		ST-1244-9
39	F H	Bridge, Support		ST-1244-1
40	F H	Washer, Thrust		ST-1244-5
41	F H	Nut (1-8 Thread)		ST-1244-4
42	F H	Nut (9/16-12 Thread)		ST-1244-3
43	F H	Driver		ST-1244-8
44	F H	Driver, Valve Guide		3375282
45	F H	Attachment, Dial Gage		ST-1325
46	F H	Bushing, Block and Mandrel, Lever	5180-00-916-1813	ST-249
47	F H	Mandrel		ST-249-1
48	F H	Mandrel		ST-249-2
49	F H	Sleeve		ST-249-3
50	F H	Spacer, Crosshead Guide	4910-00-150-3797	ST-633
51	F H	Mandrel Set, Machine	3460-00-499-1210	ST-691
52	F H	Mandrel		ST-691-1
53	F H	Block		ST-691-2
54	F H	Mandrel		ST-691-3
55	F H	Mandrel, "O" Ring, Lubricating Oil Cooler		ST-1218
56	F H	Pulley Assembly, Tool	5180-00-944-0374	ST-386
57	F H	Arbor		ST-386-2
58	F H	Nut		ST-386-3
59	F H	Adapter, Ball, Thrust Bearing		ST-386-11
60	F H	Spacer		ST-386-5
61	F H	Adapter		3375205
62	F H	Adapter (2-1/4 In. X 7/8 in. Dia.)		ST-386-10
63	F H	Adapter (2-1/4 in. X 1 In. Dia.)		ST-386-9
64	F H	Adapter (2-1/4 In. X 1 In. Dia.)		ST-386-8
65	F H	Adapter (1-7/8 In. X 1 In. Dia.)		ST-386-6
66	F H	Mandrel, Water Pump Seal		ST-658
67	F H	Mandrel, Water Pump Seal	5120-00-159-8916	ST-659
68	F H	Fixture, Bearing Disassembly		ST-1114
69	F H	Water Pump Seal Driver		ST-1159
70	F H	Driver, Water Pump Drive Shaft Oil Seal		3375180
71	F H	Adapter, Torque Wrench	5120-00-103-4687	ST-669
72	F H	Driver, 3/8 In., Plastic Handle		F-40A

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
73	F H	Handle		ST-699-1
74	F H	Blade, Screwdriver 1/2 In. X 0.062 In.		M-1302A-5
75	F H	Blade, Screwdriver 1/4 In. X 0.032 In.		TM-82
76	F H	Socket, 3/4 In. Deep Double Hex		M-1302B-24
77	F H	Socket, 9/16 In. Deep Double Hex		M-1302B-18
78	F H	Rod, Expanding		CG-40-4
79	F H	Collet 43/64 to 52/64		CG-40-11
80	F H	Socket 1/4 In. 12 Point, 1/4 In. Drive		STMD-8
81	F H	Socket, Jacobs Brake		B1465A
82	O F H	Installing Tool, Seal		RD259A
83	O F H	Handle, Seal Installing Tool		RD263
84	F H	Fixture, Injector Timing	4910-00-712-0537	ST-593
85	F H	Wrench, Air Compressor	5120-01-072-2952	3375159
86	F H	Bar, Bearing Puller		11074
87	F H	Yoke Installer		J-26422-10
88	F H	Wrench, Differential Adjusting Nut		J-972
89	F H	Tool, Remove-Replace Windshield Moulding	5120-00-279-8422	CPR109701
90	F H	Tool, Yoke Installer	4120-01-014-0017	J-26422
91	F H	Shaft, 1 1/4-12 Thread		J-26422-2
92	F H	Nut		J-26422-3
93	F H	Shaft 1 1/4-12		J-26422-4
94	F H	Sleeve		J-26422-1
95	F H	Wear Sleeve Installation Tool		J-26424
96	O F H	Socket, Pusher Axle 3 3/16 In.		J-7757-2
97	O F H	Thermostat Seal Mandrel		ST-1225
98	O F H	Socket, Wheel Bearing		1902
99	H	Tool, Counterbore	5120-00-150-7488	ST-1295
100	H	Holder, Tool	5120-00-150-7489	ST-1065
101	H	Tool Bit, Counterbore		ST-1059-17
102	H	Boring Tool, Liner Counterbore		ST-1168
103	H	Bearing, Drive		ST-1168-4
104	H	Screw, Drive		ST-1168-6
105	H	Shaft, Drive		ST-1168-3
106	H	Sprocket, Drive		ST-1168-5
107	H	Chain, Drive		ST-1168-7
108	H	Sprocket, Drive		ST-1168-10
109	H	Tool Bit		ST-1168-19
110	H	Ring, Snap, Drive Shaft		ST-1168-8

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
111	H	Ring, Snap, Drive Bearing		ST-1168-9
112	H	Counterbore Tool Liner		ST-1255
113	H	Chamfer Tool, Lower Bore Sleeve		ST-1318
114	H	Tool Bit		ST-1318-23
115	H	Bore Tool, Lower Liner		ST-1287
116	H	Tool Bit		ST-1287-10
117	H	Puller, Shoulder Bolt, Gear Crank		3375081
118	H	Puller, Gear, Crank Bridge Assembly		3375075
119	H	Puller, Jaw, Crankshaft Gear		3375077
120	H	Puller-Installer, Oil Seal		ST-1259
121	H	Spacer Ring (1-7/16 In.)		ST-1259-4
122	H	Plate, Top		ST-1259-1
123	H	Spacer Ring (3/16 In.)		ST-1259-2
124	H	Screw, Allen Head (1/4-20 X 1/2 In.)		ST-1259-3
125	H	Screw, Main Puller (1/2-13 X 2 In.)		ST-1259-7
126	H	Screw, Allen Head (1/4-20 X 1-3/4 In.)		ST-1259-5
127	H	Screw, Seal Puller		ST-1259-6
128	H	Clamp, Cylinder Liner	5120-00-104-1816	ST-1184
129	H	Driver		3375153
130	H	Gear & Spacer Mandrel, Lubricating Oil Pump		ST-1157
131	H	Bushing Mandrel, Lubricating Pump		ST-1158
132	H	Bushing Tool, Lubrication Pump Body Cover		3375206
133	H	Bushing, Guide		3375223
134	H	Adapter, Drive		3375229
135	H	Housing, Main Bore		3375220
136	H	Knob, Plastic		3375228
137	H	Dial Indicator		3375227
138	H	Tool Bit		3375226
139	H	Tool Bit		3375225
140	H	Tool Bit		3375207
141	H	Knob, Cutter Adjusting		3375224
142	H	Bushing, Guide		3375221
143	H	Bushing, Guide		3375222
144	H	Orifice Torque	5120-01-072-2955	ST-1090
145	H	Driver, Torque Wrench		ST-1090-1
146	H	Screwdriver		ST-1090-2
147	H	Screw, Set		ST-1090-4
148	H	Wrench, Allen, 5/64 In.		ST-1090-3
149	H	Checking Tool, Injector Protrusion		ST-981

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).

Tool or Test Equipment Number Reference Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool
150	H	Torque Tool, Injector		ST-1145
151	H	Fixture, Top Stop Injector Setting		3375160
152	H	Tool, Adjusting		3375165
153	H	Crowsfoot, 1-3/8 In., Locknut Wrench		3375166
154	H	Wrench, Inch Pound Torque		3375232
155	H	Block, Weight Carrier		ST-1231
156	H	Puller, Tachometer Drive		ST-1326
157	H	Collar		ST-1326-2
158	H	Collet		ST-1326-1
159	H	Adapter Plate, Fuel Filter		3375014
160	H	Gasket		3375015
161	H	Front Cover, Main Shaft Assembly		3375175
162	H	Driver, Front Cover		3375174
163	H	Driver, Main Shaft Seal		3375173
164	H	Installation Tool, Main Shaft & Bearing		3375172
165	H	Installation Tool, Throttle Shaft Ball		3375204
166	H	Adjust Kit, AFC Fuel Pump		3375189
167	H	Installation Tool, No Air Screw "O" Ring		3375148
168	H	Tool, AFC No Air Adjusting		3375140
169	H	Installation Tool, Glyd Ring		3375146
170	H	Forming Tool, Glyd Ring		3375147
171	H	Tool, AFC Adjusting		3375137
172	H	Installation Tool, Cast Governor Weight Carrier		3375230
173	H	Mandrel, Tachometer Drive Cup Plug		3375271
174	H	Throttle Travel Template	5120-01-074-0020	3375355
175	H	Turbo Support Block		ST-608
176	H	Socket, Wrench	5120-00-116-7625	ST-1095
177	H	Puller Assembly	5120-00-065-1031	ST-544
178	H	Screw		ST-544-2
179	H	Puller		ST-544-1
180	H	Holder	5120-00-923-0856	ST-851
181	H	Lock Tester 2 In.		TLN-1000
182	H	Lock Tester 3 In.		ITL42
183	H	Step Plate, Mechanic	5120-00-473-6921	8B7560
184	H	Bracket		FT901
185	H	Installer		2P8260
186	H	Staking Tool, Pinion Bearing		26883

Section III TOOL & TEST EQUIPMENT REQUIREMENTS (Continued).				
Tool or Test Equipment Number Reference Code	**Maintenance Category**	**Nomenclature**	**National/Nato Stock Number**	**Tool**
187	H	Carrier Stand		J-3409-1
188	H	Adapter Pot, Injector		3375086
189	H	Assembly Tool, "O" Ring	5120-00-396-8089	ST-422
190	H	Assembly Tool, Tube	5120-00-999-1505	ST-835
191	H	Driver, Governor Cylinder	4910-00-150-5801	ST-853
192	H	Adjusting Tool	4910-00-150-5805	ST-984
193	H	Assembly Tool, Tachometer	5120-00-896-8087	ST-1032
194	H	Driver, Seal, Crankshaft	4910-00-150-5810	ST-997
195	H	Pins		ST-997-6
196	H	Wrench, Injector	5120-00-150-7492	ST-995
197	H	Mandrel, Camshaft Bushing	5120-00-055-4013	ST-1228
198	H	Shank, Mandrel		ST-1228-3
199	H	Driver		ST-1228-9
200	H	Puller Assembly		ST-1228-13
201	H	Guide		ST-1228-5
202	H	Guide (2-1/2 In.)		3375154
203	H	Shaft Assembly		ST-1228-4
204	H	Roll Pin		ST-1228-14
205	H	Rod		ST-1228-2
206	H	Slide Hammer		ST-1228-1
207	H	Bushing Driver	4910-00-150-5802	ST-1242
208	H	Block		ST-1242-3
209	H	Cup		ST-1242-2
210	H	Pin, Cotter		ST-1242-6
211	H	Driver (Tapered)		ST-1242-4
212	H	Knock-Out Ring (Tapered)		ST-1242-5
213	H	Knock-Out Ring (Straight)		ST-1242-7
214	H	Driver, Straight		ST-1242-8
215	H	Mandrel		ST-1242-1
216	H	Fixture, Ream, Fuel Pump Front Main Bearing	5110-00-981-3107	ST-490
217	H	Puller, Mechanical	5120-00-999-1504	ST-709
218	H	Puller, Bushing		3375108
219	H	Vise, Ball Joint	4910-00-999-5106	ST-302
220	H	Front Seal Assembly	5120-00-896-8097	ST-419
221	H	Gage, Groove Wear	5210-00-999-1209	ST-560

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION.

C-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the M915, M916, M920 Truck Tractors and Chassis for M917, M918, and M919.

These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS.

a. *Column 1 – Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. *Column 2 – Level.* This column identifies the lowest level of maintenance that requires the listed item.

C – Operator/Crew.

O – Organizational Maintenance.

F – Direct Support Maintenance.

H – General Support Maintenance.

c. *Column 3 – National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column 4 – Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (BSCM) in parentheses, if applicable.

e. *Column 5 – Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differes from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C		Grease, Automotive and Artillery GAA (MIL-G-10924C)	
		9150-00-065-0029	2-1/4-oz tube	oz
		9150-00-935-1017	14-oz cartridge	oz
		9150-00-190-0904	1-lb can	lb
		9150-00-190-0905	5-lb can	lb
		9150-00-190-0907	35-lb can	lb
2	C		Oil, Lubricating, Exposed Gear, CW (VV-L-751C)	
		9150-00-234-5197	5-lb can	lb
		9150-00-261-7891	35-lb pail	lb
3	O		Oil, Lubricating, Gear Subzero, GOS (MIL-L-10324)	
		9150-00-261-7904	1-qt can	qt
		9150-00-257-5440	5-gal drum	gal
		9150-00-257-5443	55-gal drum	gal
4	C		Oil, Lubricating OE/HDO 10 (MIL-L-2104C)	
		9150-00-265-9425	1-qt can	qt
		9150-00-265-9428	5-gal drum	gal
		9150-00-265-9429	55-gal drum, 16 gage	gal
		9150-00-265-9430	55-gal drum, 18 gage	gal
5	C		Oil, Lubricating, OE/HDO 30 (MIL-L-2104C)	
		9150-00-265-9433	1-qt can	qt
		9150-00-265-9435	5-gal drum	gal
		9150-00-265-9436	55-gal drum, 16 gage	gal
		9150-00-265-9437	55-gal drum, 18 gage	gal

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST (Continued).

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
6	C		Oil, Lubricating, OE/HDO 50 (MIL-L-2104C)	
		9150-00-265-9440	1-qt can	qt
		9150-00-265-9442	5-gal drum	gal
		9150-00-265-9441	55-gal drum, 16 gage	gal
7	O		Oil, Lubricating, OHT, (MIL-H-60830)	
8	O		Oil, Lubricating, OEA, ICE, Subzero, (MIL-L-46167)	
9	O		Lubricant, Gear, Universal, (MIL-L-2106)	
10	C		Oil, Fuel, Diesel DF-1 Winter (VV-F-800)	
		9140-00-286-5286	Bulk	gal
		9140-00-286-5287	5-gal can	gal
		9140-00-286-5288	55-gal drum, 16 gage	gal
		9140-00-286-5289	55-gal drum, 18 gage	gal
11	C		Oil, Fuel, Diesel DF-2 Regular (VV-F-800)	
		9140-00-286-5294	Bulk	gal
		9140-00-286-5295	5-gal can	gal
		9140-00-286-5296	55-gal drum, 16 gage	gal
		9140-00-286-5297	55-gal drum, 18 gage	gal
			MISCELLANEOUS	
12	C		Solvent, Dry Cleaning, SD-2 (P-D-680)	
		6850-00-664-5685	1-qt can	qt
		6850-00-281-1985	1-gal can	gal

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST (Continued).

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
13	C	6850-00-243-1992	Antifreeze, Permanent, Glycol, Inhibited (MIL-A-46153)	1 gal
14	O	8030-00-889-3535	Tape, Antiseizing	
15	O		Soap Solution	
16	O		Lubriplate	
17	O	8030-00-252-3391	Silicone Sealant	

APPENDIX D

SCHEMATIC DIAGRAMS

Section I INTRODUCTION.

D-1. SCOPE.

This appendix provides you with electrical system and compressed air system schematic diagrams.

NOTE

Fold out diagrams are located at the end of this technical manual.

D-2. ELECTRICAL DIAGRAMS.

Figure FO-1. Left and Right Hand Front Signal Lamp Harness Assemblies (M915 thru M920).
Figure FO-2. Left and Right Hand Fender Harness Assemblies (M915 thru M920).
Figure FO-3. Engine Harness Assembly (M915 thru M920).
Figure FO-4. Cab Marker Lamp Harness Assembly (M916 & M920).
Figure FO-5. Cab Front and Underbody Harness Assembly (M915 thru M920).
Figure FO-6. Chassis Harness Assembly (M915, M916 & M920).
Figure FO-7. Chassis Harness Assembly (M917).
Figure FO-8. Chassis Harness Assembly (M918 & M919).
Figure FO-9. Instrument Panel Harness Assembly (M915).
Figure FO-10. Instrument Panel Harness Assembly (M916 and M920).
Figure FO-11. Instrument Panel Harness Assembly (M917, M918 and M919).
Figure FO-12. M915, Line Haul Truck Tractor Electrical Diagram.
Figure FO-13. M916 Light Equipment and M920 Medium Equipment Transporter Truck Tractor Electrical Diagram.
Figure FO-14. M917, 20-Ton Dump Truck Chassis Electrical Diagram.
Figure FO-15. M918 Bituminous Distributor and M919 Concrete-Mobile® Mixer Truck Chassis Electrical Diagram.

D-3. COMPRESSED AIR.

Figure FO-16. M915 Tractor Schematic Diagram.
Figure FO-17. M916 Tractor Schematic Diagram.
Figure FO-18. M917 Dump Truck Connecting Schematic Diagram.
Figure FO-19. M918 Bituminous Distributor Connecting Schematic Diagram.
Figure FO-20. M919 Concrete-Mobile® Mixer Connecting Schematic Diagram.
Figure FO-21. M920 Tractor Schematic Diagram.

APPENDIX E

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I INTRODUCTION.

E-1. GENERAL.

a. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational level.

b. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

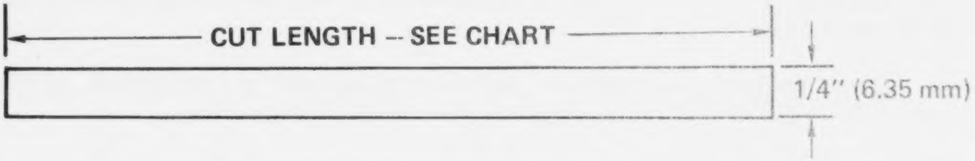
c. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

E-2. MANUFACTURED ITEM PART NUMBER INDEX.

PART NO.	FIGURE NO.	PART NO.	FIGURE NO.	PART NO.	FIGURE NO.
M/145-20027	E-5	M/357-20071	E-1	M/357-20101	E-1
M/145-20028	E-5	M/357-20072	E-1	M/357-20102	E-1
M/145-20049	E-5	M/357-20073	E-1	M/357-20103	E-4
M/357-20001	E-1	M/357-20074	E-3	M/357-20112	E-3
M/357-20002	E-2	M/357-20075	E-3	M/357-20113	E-3
M/357-20005	E-3	M/357-20076	E-3	M/357-20114	E-3
M/357-20006	E-3	M/357-20077	E-3	M/357-20115	E-3
M/357-20008	E-4	M/357-20078	E-1	M/357-20116	E-3
M/357-20009	E-4	M/357-20080	E-4	M/357-20117	E-3
M/357-20012	E-4	M/357-20086	E-3	M/357-20118	E-1
M/357-20052	E-4	M/357-20087	E-3	M/357-20119	E-1
M/357-20053	E-4	M/357-20088	E-3	M/357-20120	E-1
M/357-20057	E-3	M/357-20089	E-3	M/357-20126	E-3
M/357-20059	E-1	M/357-20090	E-3	M/357-20127	E-2
M/357-20060	E-1	M/357-20091	E-2	M/357-20128	E-2
M/357-20061	E-2	M/357-20092	E-2	M/357-20129	E-2
M/357-20062	E-1	M/357-20093	E-2	M/357-20130	E-2
M/357-20063	E-1	M/357-20094	E-2	M/357-20131	E-2
M/357-20064	E-2	M/357-20095	E-2	M/357-20132	E-2
M/357-20066	E-1	M/357-20096	E-1	M/357-20133	E-2
M/357-20067	E-1	M/357-20097	E-1	M/357-20134	E-2
M/357-20068	E-2	M/357-20098	E-1	M/357-20135	E-2
M/357-20069	E-2	M/357-20099	E-1	MA145-20001	E-5
M/357-20070	E-2	M/357-20100	E-1	MB147-20001	E-6

Section II ILLUSTRATED MANUFACTURING INSTRUCTIONS.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
1/4" (6.35 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3A



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20059	5.50 (139.7)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
2	M/357-20097	10.50 (266.7)	68NTA-4-6	30759		68NTA-4-4	30759	
3	M/357-20060	11.00 (279.4)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
4	M/357-20062	12.00 (304.8)	1468X4	79470	4730-01-055-4017	1468X4	79470	4730-01-055-4017
5	M/357-20098	14.50 (368.3)	68NTA-4-4	30759		68NTA-4-4	30759	
6	M/357-20119	14.75 (374.6)	1468X4	79470	4730-01-055-4017	1469X4	79470	4730-01-055-4013
7	M/357-20067	16.75 (425.4)	1469X4	79470	4730-01-055-4013	1468X4	79470	4730-01-055-4017
8	M/357-20071	18.00 (457.2)	1466X4	79470		1466X4	79470	
9	M/357-20078	18.00 (457.2)	68NTA-4-6	30759		68NTA-4-6	30759	
10	M/357-20072	19.00 (482.6)	1466X4	79470		1466X4	79470	
11	M/357-20066	20.75 (527.05)	1469X4	79470	4730-01-055-4013	1468X4	79470	4730-01-055-4017
12	M/357-20118	23.00 (584.2)	1468X4	79470	4730-01-055-4017	1469X4	79470	4730-01-055-4013
13	M/357-20102	24.00 (609.6)	1464X4	79470		68NTA-4-4	30759	
14	M/357-20096	24.00 (609.6)	62NTA-4	30759		1469X4	79470	4730-01-055-4013
15	M/357-20120	29.00 (736.6)	1466X4	79470		1469X4	79470	4730-01-055-4013
16	M/357-20001	38.00 (965.2)	68NTA-4-6	30759		68NTA-4-6	30759	
17	M/357-20073	58.25 (1479.5)	272NTA-4-4	30759		68NTA-4-6	30759	
18	M/357-20099	65.00 (1651.0)	68NTA-4-4	30759		1469X4X6	79470	
19	M/357-20063	100.00 (2540.0)	279NTA-4-4	30759		68NTA-4-4	30759	
20	M/357-20101	120.00 (3048.0)	269NTA-4-4	30759		264NTA-4-4	30759	
21	M/357-20100	150.00 (3810.0)	269NTA-4-4	30759		264NTA-4-4	30759	

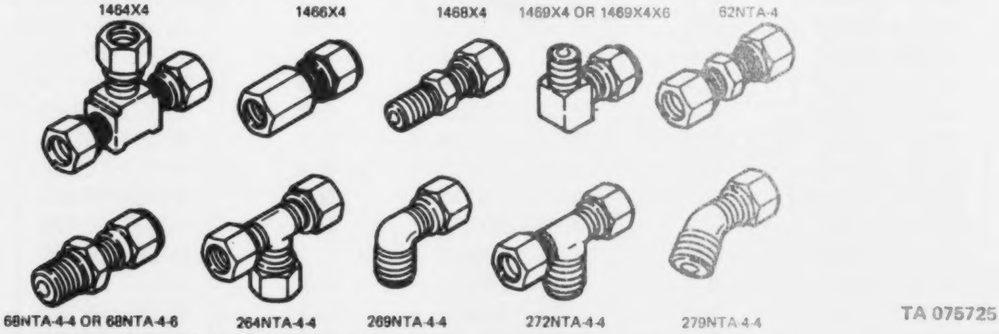
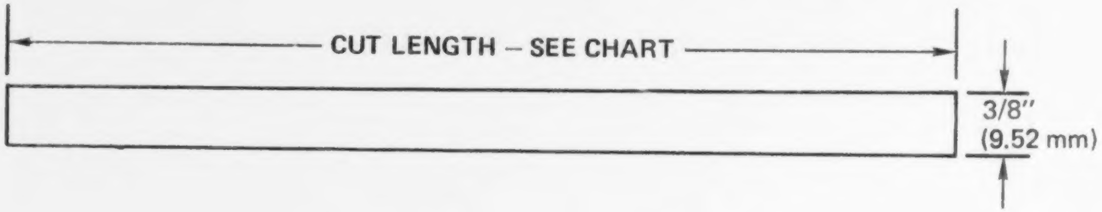


Figure E-1. 1/4" (6.35mm) O.D. Nonmetallic Tubing and Fittings, Fabricate Tube From NSN 4720-01-058-7213

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
3/8" (9.52 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B



ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20002	8.50 (215.9)	1480X6X6	79470		1472X6X6X6	79470	
2	M/357-20061	9.50 (241.3)	68NTA-6-6	30759		269NTA-6-4	30759	4730-01-082-6475
3	M/357-20070	11.00 (279.4)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-6	30759	
4	M/357-20069	11.50 (292.1)	269NTA-6-6	30759		68NTA-6-6	30759	
5	M/357-20095	12.00 (304.8)	1472X6X6X6	79470		68NTA-6-6	30759	
6	M/357-20092	20.00 (508.0)	269NTA-6-6	30759		68NTA-6-6	30759	
7	M/357-20064	25.00 (635.0)	68NTA-6-4	30759	4730-01-062-2570	68NTA-6-4	30759	4730-01-062-2570
8	M/357-20068	27.00 (685.8)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-6	30759	
9	M/357-20091	33.00 (838.2)	68NTA-6-4	30759	4730-01-062-2570	269NTA-6-4	30759	4730-01-082-6475
10	M/357-20128	38.50 (977.9)	169NTA-6-8	30759		68NTA-6-6	30759	
11	M/357-20127	38.50 (977.9)	169NTA-6-8	30759		68NTA-6-6	30759	
12	M/357-20133	86.00 (2184.4)	269NTA-6-4	30759	4730-01-082-6475	269NTA-6-8	30759	
13	M/357-20131	103.00 (2616.2)	269NTA-6-4	30759	4730-01-082-6475	169NTA-6-8	30759	
14	M/357-20135	124.00 (3149.6)	68NTA-6-8	30759		68NTA-6-6	30759	
15	M/357-20134	127.00 (3225.8)	68NTA-6-8	30759		68NTA-6-6	30759	
16	M/357-20132	135.00 (3429.0)	68NTA-6-6	30759		269NTA-6-4	30759	4730-01-082-6475
17	M/357-20129	157.00 (3987.8)	68NTA-6-6	30759		68NTA-6-8	30759	
18	M/357-20130	168.00 (4267.2)	1480X6X8	79470		68NTA-6-6	30759	
19	M/357-20093	194.00 (4927.6)	68NTA-6-4	30759	4730-01-062-2570	68NTA-6-4	30759	4730-01-062-2570
20	M/357-20094	207.00 (5257.8)	68NTA-6-4	30759	4730-01-062-2570	1480X6X8	79470	

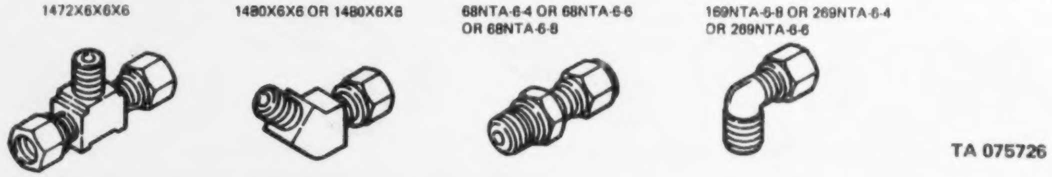
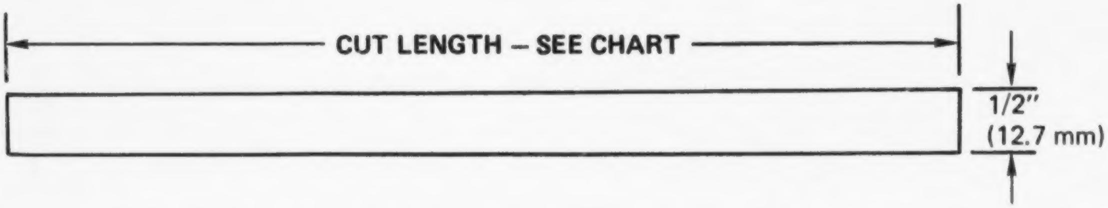

1472X6X6X6
1480X6X6 OR 1480X6X8
68NTA-6-4 OR 68NTA-6-6 OR 68NTA-6-8
169NTA-6-8 OR 269NTA-6-4 OR 269NTA-6-6
TA 075726

Figure E-2. 3/8" (9.52mm) O.D. Nonmetallic Tubing and Fittings, Fabricate Tube From NSN 4720-01-040-0591

INSTRUCTIONS:

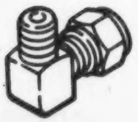
1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
1/2" (12.7 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B

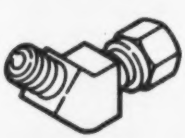


ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	END FITTINGS PART NUMBER					
			VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20090	12.50 (317.5)	264NTA-8	30759		1469X8	79470	
2	M/357-20005	14.00 (355.6)	68NTA-8-6	30759		68NTA-8-6	30759	
3	M/357-20112	19.50 (495.3)	68NTA-8-6	30759		68NTA-8-6	30759	
4	M/357-20086	20.00 (508.0)	68NTA-8-6	30759		1469X8	79470	
5	M/357-20116	20.50 (520.7)	68NTA-8-6	30759		68NTA-8-6	30759	
6	M/357-20117	23.00 (584.2)	68NTA-8-6	30759		68NTA-8-6	30759	
7	M/357-20057	23.00 (584.2)	68NTA-8-6	30759		68NTA-8-6	30759	
8	M/357-20006	23.50 (596.9)	264NTA-8	30759		68NTA-8-6	30759	
9	M/357-20087	24.00 (609.6)	68NTA-8-6	30759		68NTA-8-6	30759	
10	M/357-20114	24.50 (622.3)	68NTA-8-6	30759		68NTA-8-6	30759	
11	M/357-20076	26.00 (660.4)	1469X8	79470		272NTA-8-6	30759	
12	M/357-20115	26.50 (673.1)	68NTA-8-6	30759		68NTA-8-6	30759	
13	M/357-20089	31.00 (787.4)	269NTA-8-6	30759		68NTA-8-6	30759	
14	M/357-20075	41.00 (1041.4)	1469X8	79470		272NTA-8-6	30759	
15	M/357-20126	69.00 (1752.6)	1469X8	79470		68NTA-8-6	30759	
16	M/357-20077	72.00 (1828.8)	1469X8	79470		1480X8	79470	
17	M/357-20113	73.00 (1854.2)	68NTA-8-6	30759		68NTA-8-6	30759	
18	M/357-20074	75.00 (1905.0)	1469X8	79470		1480X8X6	79470	
19	M/357-20088	100.00 (2540.0)	269NTA-8-6	30759		269NTA-8-6	30759	

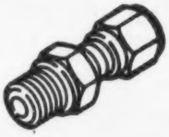
1469X8



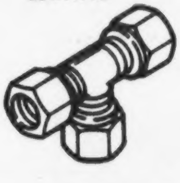
1480X8 OR 1480X8X6



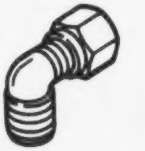
68NTA-8-6



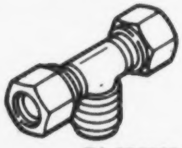
264NTA-8



269NTA-8-6



272NTA-8-6



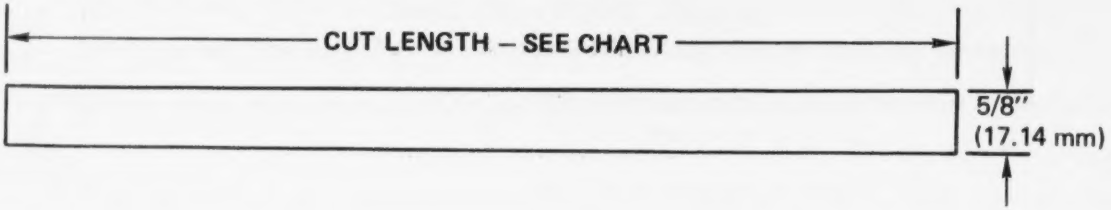
TA 075727

Figure E-3. 1/2" (12.7mm) O.D. Nonmetallic Tubing and Fittings, Fabricate Tube From NSN 4720-01-040-0592

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon the part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
5/8" (17.14 mm) OUTER DIA.	TUBE, NONMETALLIC	SAEJ844, TYPE 3B


CUT LENGTH – SEE CHART
5/8"
(17.14 mm)

			END FITTINGS PART NUMBER					
ITEM NO.	TUBE PART NUMBER	CUT LENGTH Inches (mm)	VENDOR NO.	FSCM	NSN	VENDOR NO.	FSCM	NSN
1	M/357-20009	28.00 (711.2)	1468X10	79470		1468X10	79470	
2	M/357-20008	32.00 (812.8)	1468X10X6	79470	4730-01-082-3799	1468X10	79470	
3	M/357-20053	37.50 (952.5)	1480X10	79470		68AB-10-8	30759	
4	M/357-20052	41.50 (1054.1)	1469X10X6	79470		1469X10	79470	
5	M/357-20012	53.50 (1358.9)	1468X10X12	79470		1468X10X6	79470	4730-01-082-3799
6	M/357-20103	56.50 (1435.1)	1469X10	79470		68NTA-10-6	30759	
7	M/357-20080	88.00 (2235.2)	1480X10	79470		1469X10X12	79470	

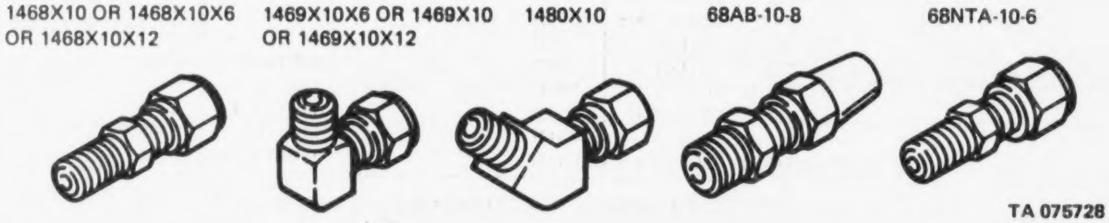
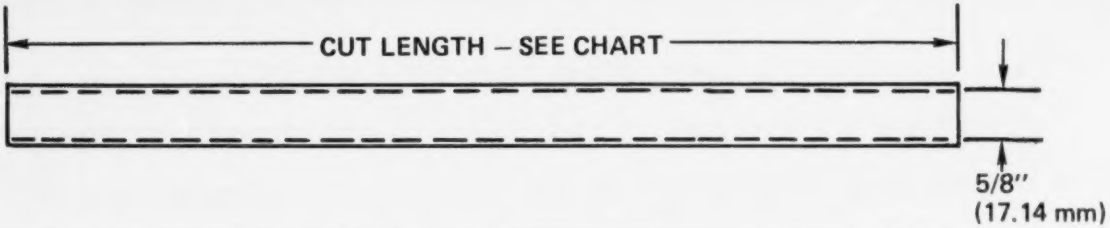

1468X10 OR 1468X10X6
OR 1468X10X12
1469X10X6 OR 1469X10
OR 1469X10X12
1480X10
68AB-10-8
68NTA-10-6
TA 075728

Figure E-4. 5/8" (17.14mm) O.D. Nonmetallic Tubing and Fittings, Fabricate Tube From NSN 4720-01-009-9058

INSTRUCTIONS:

1. Determine tube part number needed from RPSTL and cut squarely to correct length as shown above.
2. Select proper end fittings based upon tube part number.
3. Insert tube into fitting and tighten nut with wrench until one thread remains visible on the fitting body.

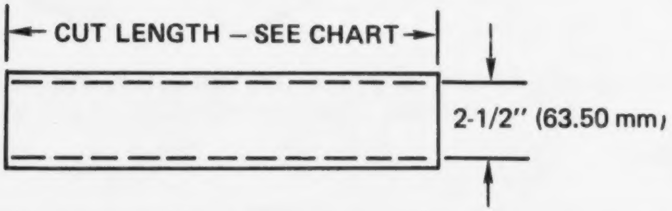
MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
5/8" (17.14 mm) INNER DIA.	HEATER HOSE	



ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)	ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)
1	MA-145-20001	3.00 (76.20)	3	M/145-20049	9.00 (228.60)
2	M/145-20027	4.25 (107.95)	4	M/145-20028	14.00 (355.60)

Figure E-5. 5/8" (17.14mm) I.D. Heater Hose, Fabricate From M/145-20038, FSCM 34623

MATERIAL BLOCK		
STOCK SIZE	DESCRIPTION	SPECIFICATION
2-1/2" (63.50 mm) INNER DIA.	RADIATOR OUTLET HOSE	



ITEM NO.	PART NUMBER	CUT LENGTH Inches (mm)
1	MB147-20001	4.00 (101.60)

TA 075729

Figure E-6. 2-1/2" (63.50mm) I.D. Radiator Outlet Hose, Fabricate From NSN 4720-00-203-3031

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To be distributed in accordance with DA Form 12-38, organizational maintenance requirements for M915, M916, M920 trucks and truck chassis for M917, M918, and M919.

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Charts Transposed to
End of Volume.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9\,(^{0}F - 32) = {}^{0}C$
212^{0} Fahrenheit is equivalent to 100^{0} Celsius
90^{0} Fahrenheit is equivalent to 32.2^{0} Celsius
32^{0} Fahrenheit is equivalent to 0^{0} Celsius
$9/5\,C^{0} + 32 = F^{0}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	**Miles per Hour**	**0.621**

0
1 CM. 2
3
4
5
6
7
8
9
10
11
12
13
14
15
INCHES
1
2
3
4
5
6

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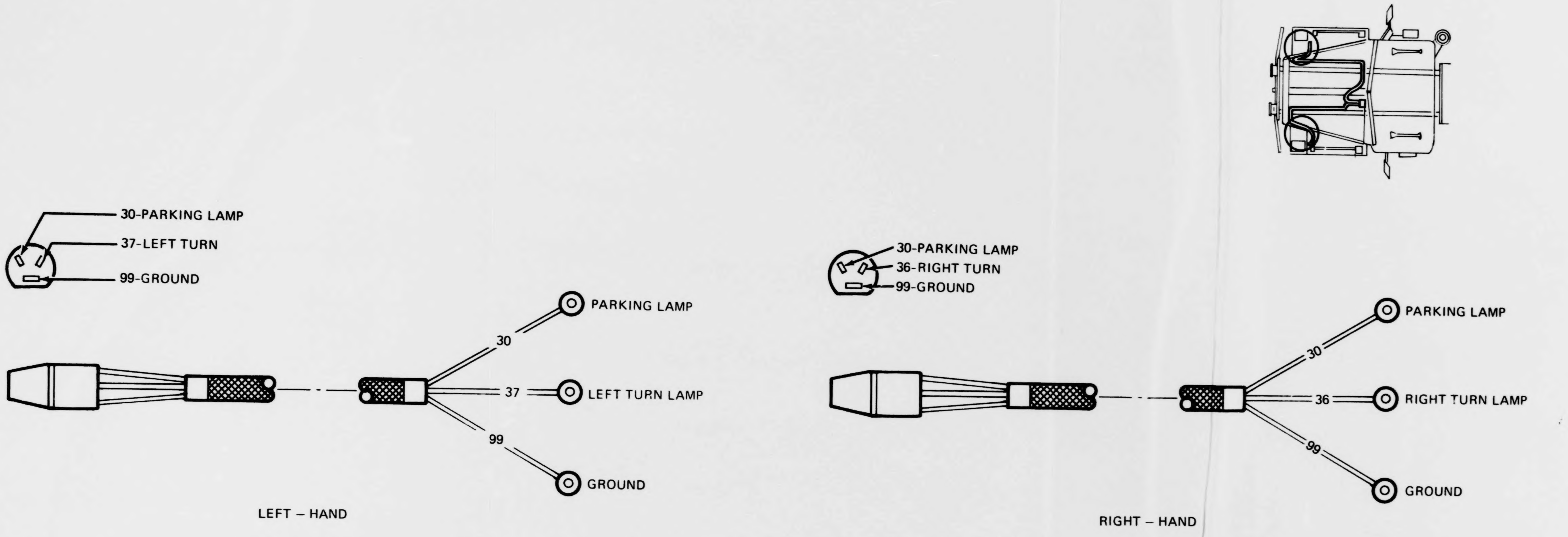
30-PARKING LAMP
37-LEFT TURN
99-GROUND
30
37
99
PARKING LAMP
LEFT TURN LAMP
GROUND
LEFT – HAND
30-PARKING LAMP
36-RIGHT TURN
99-GROUND
30
36
99
PARKING LAMP
RIGHT TURN LAMP
GROUND
RIGHT – HAND

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Figure FO-1. Left and Right Hand Front Signal Lamp Harness Assemblies (M915 thru M920).

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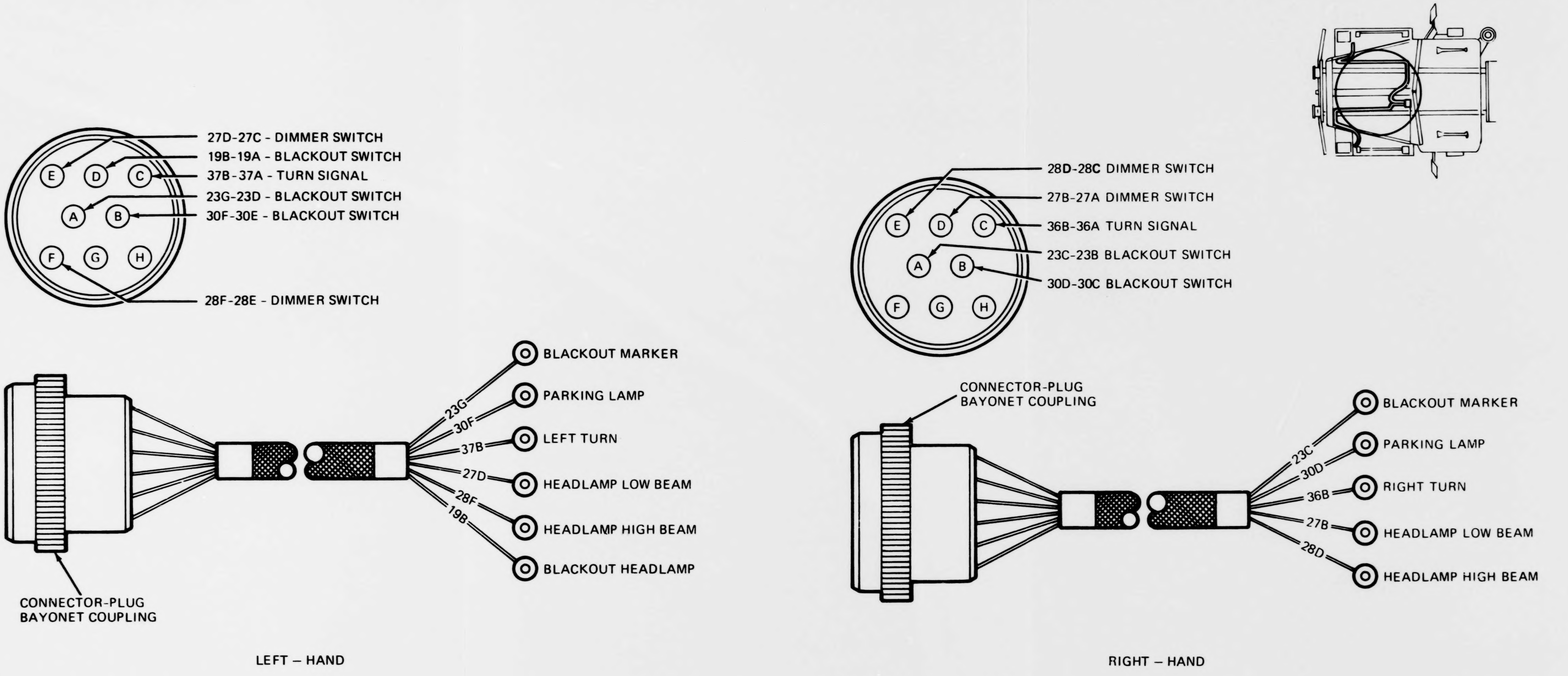
27D-27C - DIMMER SWITCH
19B-19A - BLACKOUT SWITCH
37B-37A - TURN SIGNAL
23G-23D - BLACKOUT SWITCH
30F-30E - BLACKOUT SWITCH
28F-28E - DIMMER SWITCH
E
D
C
A
B
F
G
H
BLACKOUT MARKER
PARKING LAMP
LEFT TURN
HEADLAMP LOW BEAM
HEADLAMP HIGH BEAM
BLACKOUT HEADLAMP
23G
30F
37B
27D
28F
19B
CONNECTOR-PLUG BAYONET COUPLING
LEFT – HAND
28D-28C DIMMER SWITCH
27B-27A DIMMER SWITCH
36B-36A TURN SIGNAL
23C-23B BLACKOUT SWITCH
30D-30C BLACKOUT SWITCH
CONNECTOR-PLUG BAYONET COUPLING
BLACKOUT MARKER
PARKING LAMP
RIGHT TURN
HEADLAMP LOW BEAM
HEADLAMP HIGH BEAM
23C
30D
36B
27B
28D
RIGHT – HAND

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Figure FO-2. Left and Right Hand Fender Harness Assemblies (M915 thru M920).

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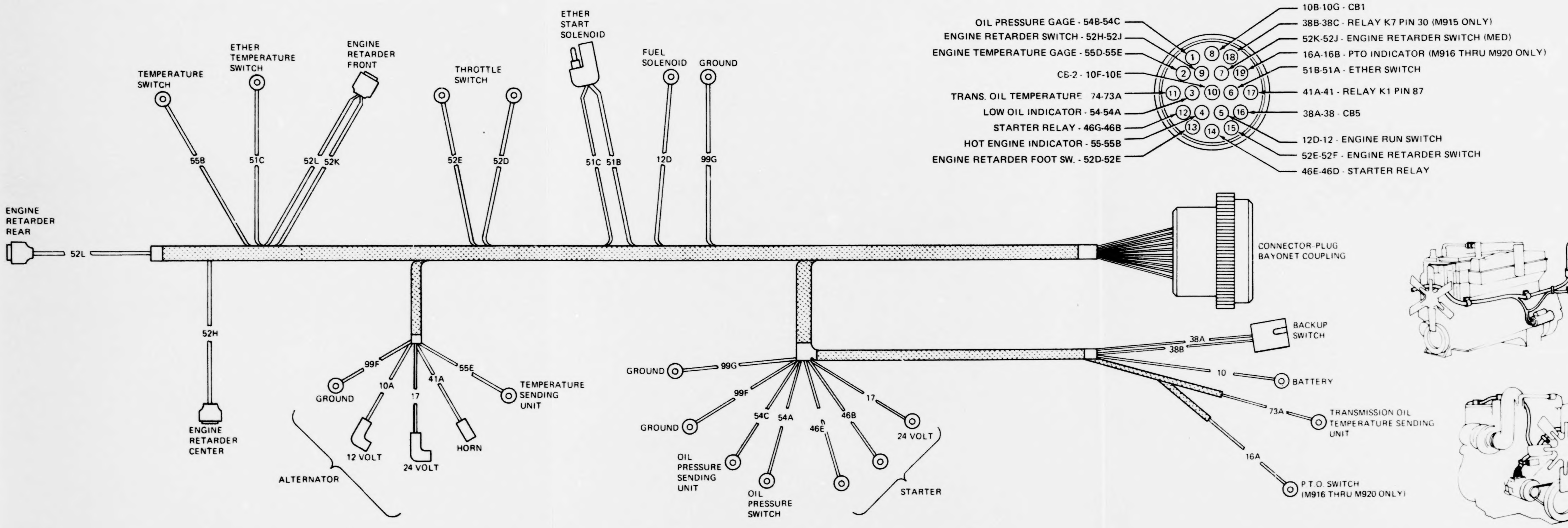
ENGINE RETARDER REAR
52L
TEMPERATURE SWITCH
55B
ETHER TEMPERATURE SWITCH
51C
ENGINE RETARDER FRONT
52L
52K
THROTTLE SWITCH
52E
52D
ETHER START SOLENOID
51C
51B
FUEL SOLENOID
12D
GROUND
99G
OIL PRESSURE GAGE - 54B-54C
ENGINE RETARDER SWITCH - 52H-52J
ENGINE TEMPERATURE GAGE - 55D-55E
CB-2 - 10F-10E
TRANS. OIL TEMPERATURE 74-73A
LOW OIL INDICATOR - 54-54A
STARTER RELAY - 46G-46B
HOT ENGINE INDICATOR - 55-55B
ENGINE RETARDER FOOT SW. - 52D-52E
1
8
18
2
9
7
19
11
3
10
6
17
12
4
5
16
13
14
15
10B-10G - CB1
38B-38C - RELAY K7 PIN 30 (M915 ONLY)
52K-52J - ENGINE RETARDER SWITCH (MED)
16A-16B - PTO INDICATOR (M916 THRU M920 ONLY)
51B-51A - ETHER SWITCH
41A-41 - RELAY K1 PIN 87
38A-38 - CB5
12D-12 - ENGINE RUN SWITCH
52E-52F - ENGINE RETARDER SWITCH
46E-46D - STARTER RELAY
CONNECTOR PLUG BAYONET COUPLING
52H
ENGINE RETARDER CENTER
99F
GROUND
10A
12 VOLT
17
24 VOLT
41A
HORN
55E
TEMPERATURE SENDING UNIT
ALTERNATOR
GROUND
99G
99F
GROUND
54C
54A
OIL PRESSURE SENDING UNIT
OIL PRESSURE SWITCH
46E
46B
17
24 VOLT
STARTER
38A
38B
BACKUP SWITCH
10
BATTERY
73A
TRANSMISSION OIL TEMPERATURE SENDING UNIT
16A
P.T.O. SWITCH (M916 THRU M920 ONLY)

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Figure FO-3. Engine Harness Assembly (M915 thru M920).

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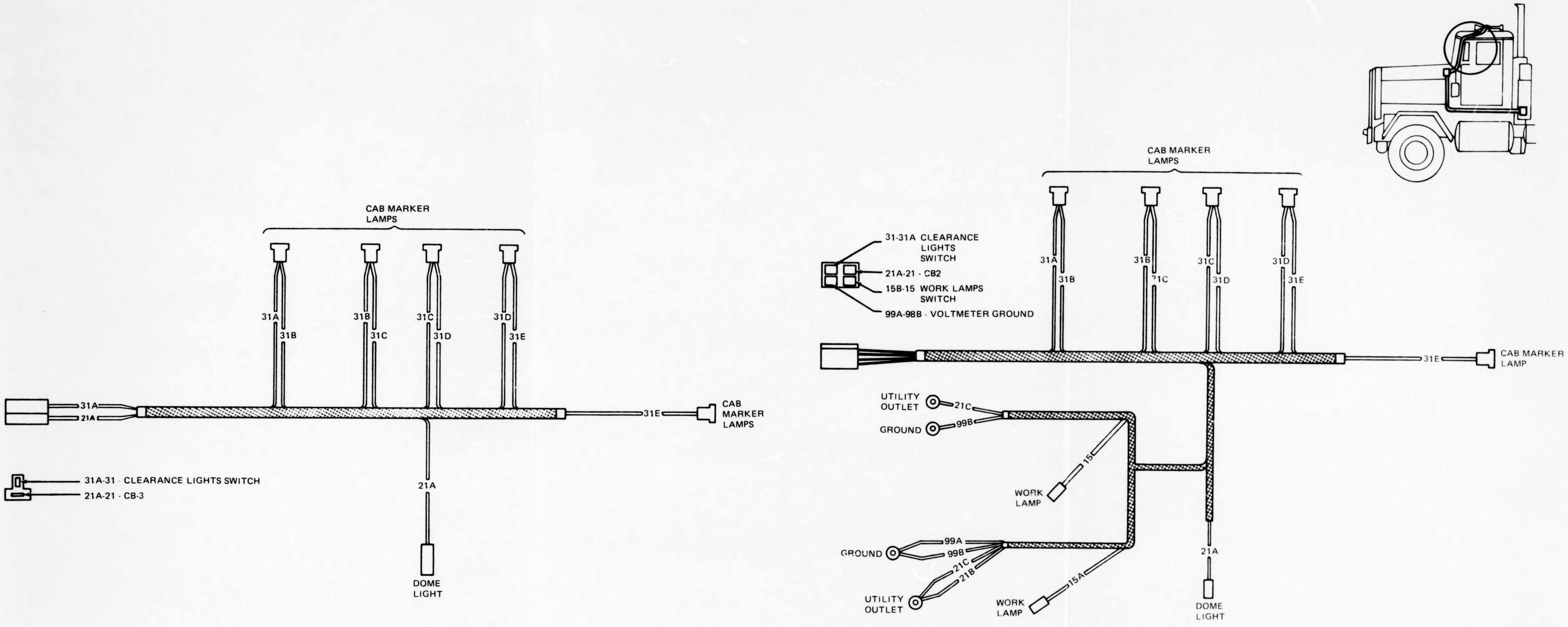
CAB MARKER LAMPS
31A
31B
31B
31C
31C
31D
31D
31E
31A
21A
31E
CAB MARKER LAMPS
31A-31 - CLEARANCE LIGHTS SWITCH
21A-21 - CB-3
21A
DOME LIGHT
CAB MARKER LAMPS
31-31A CLEARANCE LIGHTS SWITCH
21A-21 - CB2
15B-15 WORK LAMPS SWITCH
99A-98B - VOLTMETER GROUND
31A
31B
31B
21C
31C
31D
31D
31E
31E
CAB MARKER LAMP
UTILITY OUTLET
21C
GROUND
99B
15C
WORK LAMP
GROUND
99A
99B
21C
21B
UTILITY OUTLET
WORK LAMP
15A
21A
DOME LIGHT

M915, M917, M918, & M919

M916 & M920

TA237253 ■

Figure FO-4. Cab Marker Lamp Harness Assembly

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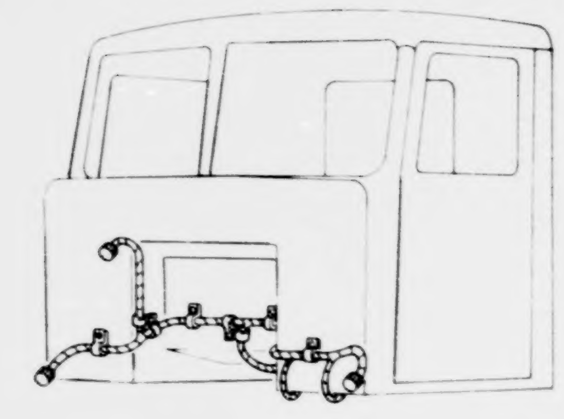

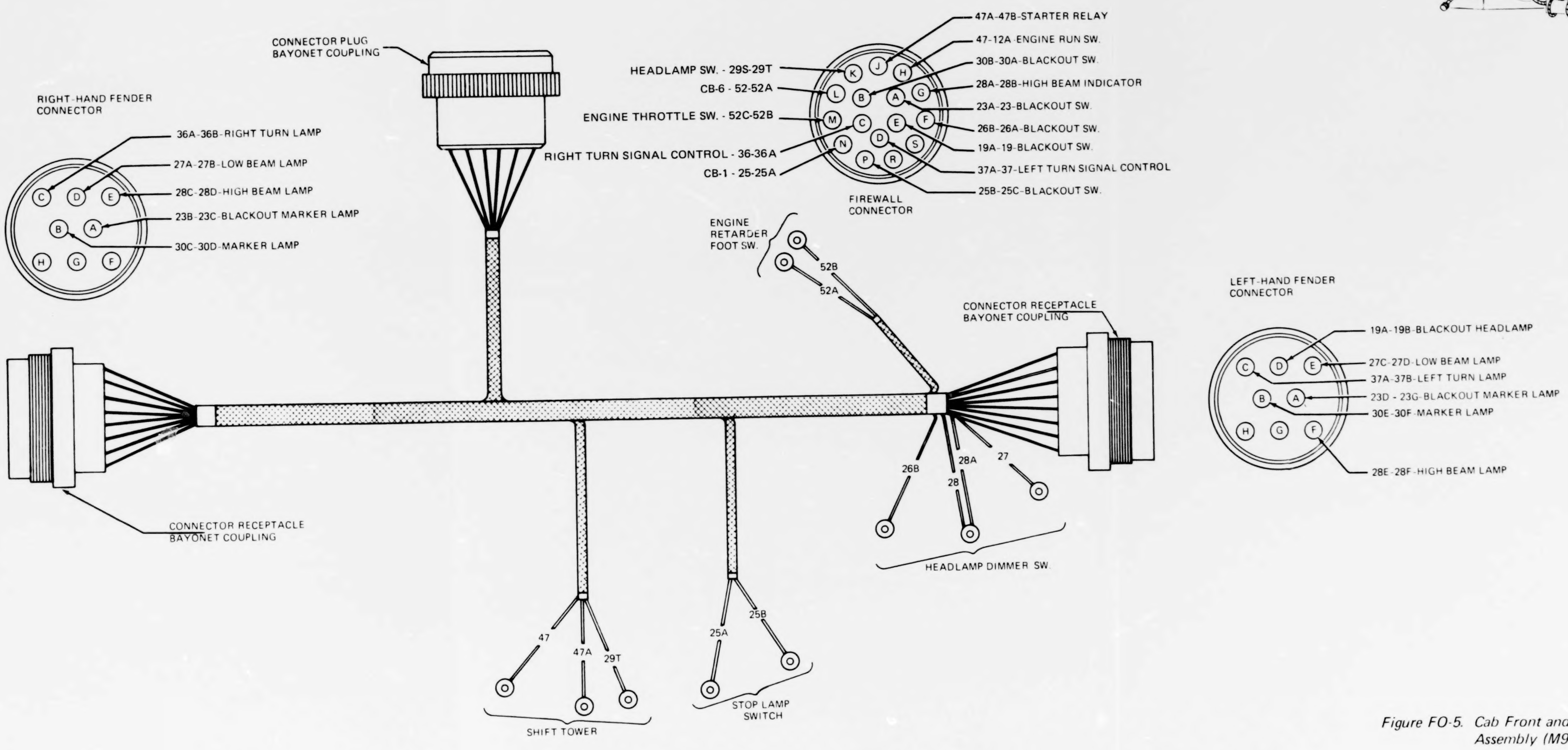
CONNECTOR PLUG
BAYONET COUPLING
RIGHT-HAND FENDER
CONNECTOR
36A-36B-RIGHT TURN LAMP
27A-27B-LOW BEAM LAMP
28C-28D-HIGH BEAM LAMP
23B-23C-BLACKOUT MARKER LAMP
30C-30D-MARKER LAMP
C
D
E
B
A
H
G
F
HEADLAMP SW. - 29S-29T
CB-6 - 52-52A
ENGINE THROTTLE SW. - 52C-52B
RIGHT TURN SIGNAL CONTROL - 36-36A
CB-1 - 25-25A
47A-47B-STARTER RELAY
47-12A-ENGINE RUN SW.
30B-30A-BLACKOUT SW.
28A-28B-HIGH BEAM INDICATOR
23A-23-BLACKOUT SW.
26B-26A-BLACKOUT SW.
19A-19-BLACKOUT SW.
37A-37-LEFT TURN SIGNAL CONTROL
25B-25C-BLACKOUT SW.
J
K
H
L
B
A
G
M
C
E
F
N
D
S
P
R
FIREWALL
CONNECTOR
ENGINE
RETARDER
FOOT SW.
52B
52A
CONNECTOR RECEPTACLE
BAYONET COUPLING
LEFT-HAND FENDER
CONNECTOR
19A-19B-BLACKOUT HEADLAMP
27C-27D-LOW BEAM LAMP
37A-37B-LEFT TURN LAMP
23D - 23G-BLACKOUT MARKER LAMP
30E-30F-MARKER LAMP
28E-28F-HIGH BEAM LAMP
C
D
E
B
A
H
G
F
CONNECTOR RECEPTACLE
BAYONET COUPLING
26B
28A
28
27
HEADLAMP DIMMER SW.
47
47A
29T
SHIFT TOWER
25A
25B
STOP LAMP
SWITCH

TA237254

Figure FO-5. Cab Front and Underbody Harness Assembly (M915 thru M920).

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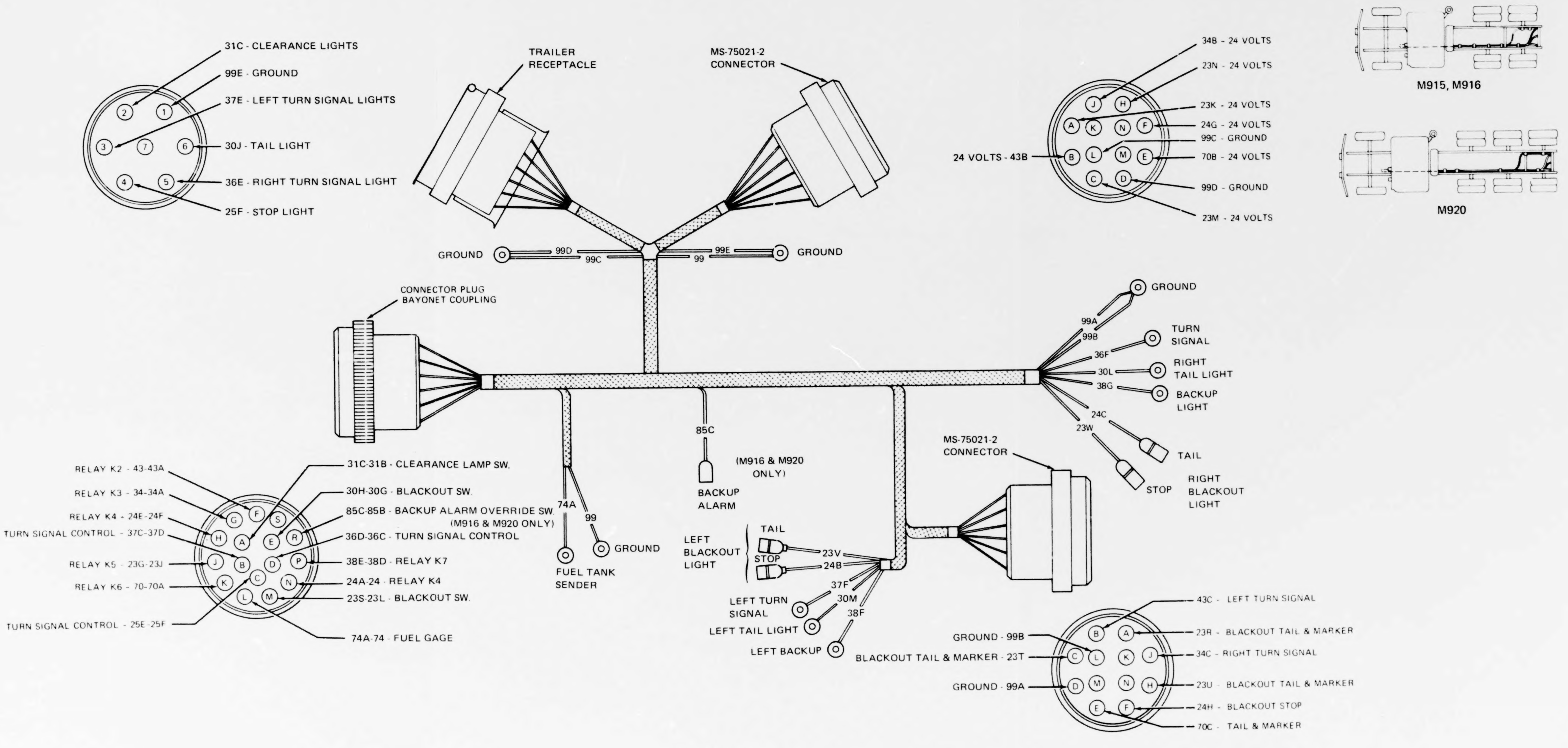
31C - CLEARANCE LIGHTS
99E - GROUND
37E - LEFT TURN SIGNAL LIGHTS
30J - TAIL LIGHT
36E - RIGHT TURN SIGNAL LIGHT
25F - STOP LIGHT
1
2
3
4
5
6
7
TRAILER RECEPTACLE
MS-75021-2 CONNECTOR
GROUND
99D
99C
99E
99
GROUND
34B - 24 VOLTS
23N - 24 VOLTS
23K - 24 VOLTS
24G - 24 VOLTS
99C - GROUND
70B - 24 VOLTS
99D - GROUND
23M - 24 VOLTS
24 VOLTS - 43B
J
H
A
K
N
F
B
L
M
E
C
D
M915, M916
M920
CONNECTOR PLUG BAYONET COUPLING
GROUND
99A
99B
36F
TURN SIGNAL
30L
RIGHT TAIL LIGHT
38G
BACKUP LIGHT
24C
23W
TAIL
STOP
RIGHT BLACKOUT LIGHT
85C
(M916 & M920 ONLY)
BACKUP ALARM
74A
99
GROUND
FUEL TANK SENDER
MS-75021-2 CONNECTOR
RELAY K2 - 43-43A
RELAY K3 - 34-34A
RELAY K4 - 24E-24F
TURN SIGNAL CONTROL - 37C-37D
RELAY K5 - 23G-23J
RELAY K6 - 70-70A
TURN SIGNAL CONTROL - 25E-25F
31C-31B - CLEARANCE LAMP SW.
30H-30G - BLACKOUT SW.
85C-85B - BACKUP ALARM OVERRIDE SW. (M916 & M920 ONLY)
36D-36C - TURN SIGNAL CONTROL
38E-38D - RELAY K7
24A-24 - RELAY K4
23S-23L - BLACKOUT SW.
74A-74 - FUEL GAGE
F
G
S
H
A
E
R
J
B
D
P
C
K
N
L
M
TAIL
STOP
LEFT BLACKOUT LIGHT
23V
24B
37F
30M
38F
LEFT TURN SIGNAL
LEFT TAIL LIGHT
LEFT BACKUP
43C - LEFT TURN SIGNAL
23R - BLACKOUT TAIL & MARKER
34C - RIGHT TURN SIGNAL
23U - BLACKOUT TAIL & MARKER
24H - BLACKOUT STOP
70C - TAIL & MARKER
GROUND - 99B
BLACKOUT TAIL & MARKER - 23T
GROUND - 99A
B
A
C
L
K
J
D
M
N
H
E
F

TA237255 ■

Figure FO-6. Chassis Harness Assembly (M915, M916, & M920).

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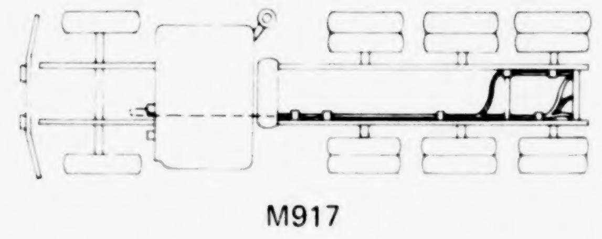

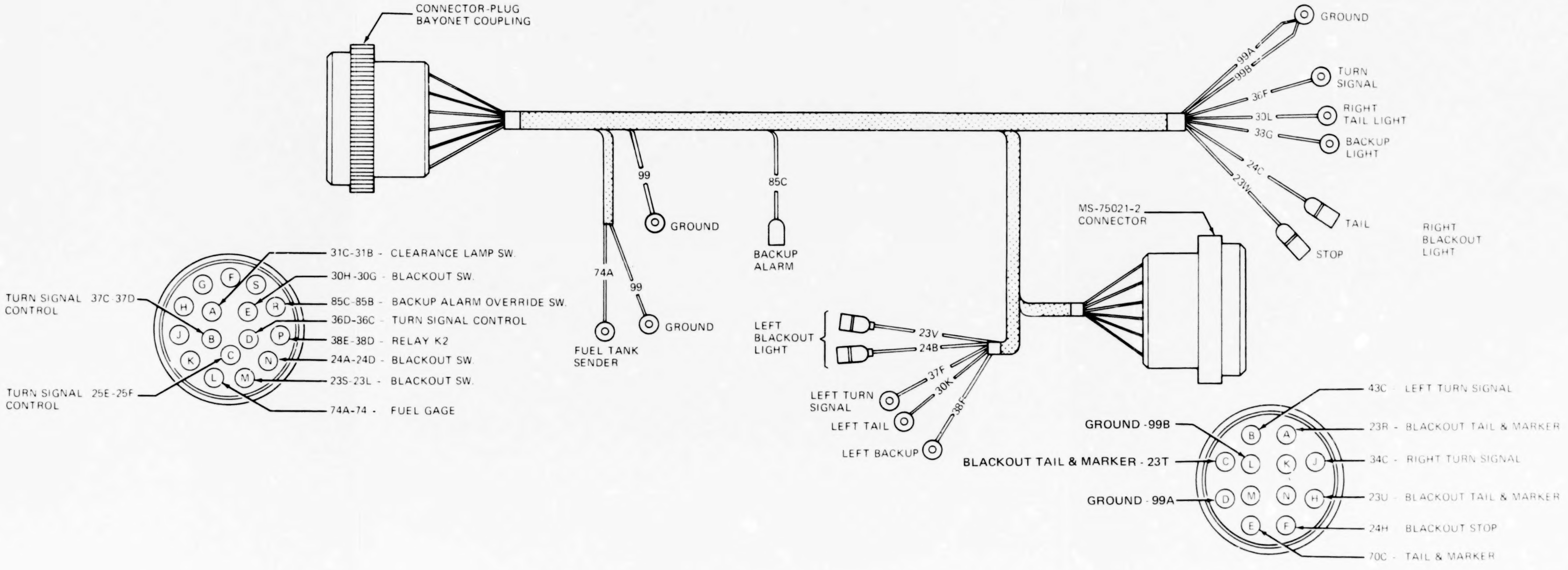
CONNECTOR-PLUG
BAYONET COUPLING
99
GROUND
85C
BACKUP
ALARM
74A
99
GROUND
FUEL TANK
SENDER
99A
99B
GROUND
36F
TURN
SIGNAL
33L
RIGHT
TAIL LIGHT
33G
BACKUP
LIGHT
24C
23W
TAIL
STOP
RIGHT
BLACKOUT
LIGHT
MS-75021-2
CONNECTOR
LEFT
BLACKOUT
LIGHT
23V
24B
37F
30K
38F
LEFT TURN
SIGNAL
LEFT TAIL
LEFT BACKUP
G
F
S
H
A
E
R
J
B
D
P
K
C
N
L
M
TURN SIGNAL 37C-37D
CONTROL
TURN SIGNAL 25E-25F
CONTROL
31C-31B - CLEARANCE LAMP SW.
30H-30G - BLACKOUT SW.
85C-85B - BACKUP ALARM OVERRIDE SW.
36D-36C - TURN SIGNAL CONTROL
38E-38D - RELAY K2
24A-24D - BLACKOUT SW.
23S-23L - BLACKOUT SW.
74A-74 - FUEL GAGE
B
A
C
L
K
J
D
M
N
H
E
F
GROUND -99B
BLACKOUT TAIL & MARKER - 23T
GROUND - 99A
43C - LEFT TURN SIGNAL
23R - BLACKOUT TAIL & MARKER
34C - RIGHT TURN SIGNAL
23U - BLACKOUT TAIL & MARKER
24H BLACKOUT STOP
70C - TAIL & MARKER

TA237256 ■

Figure FO-7. Chassis Harness Assembly (M917).

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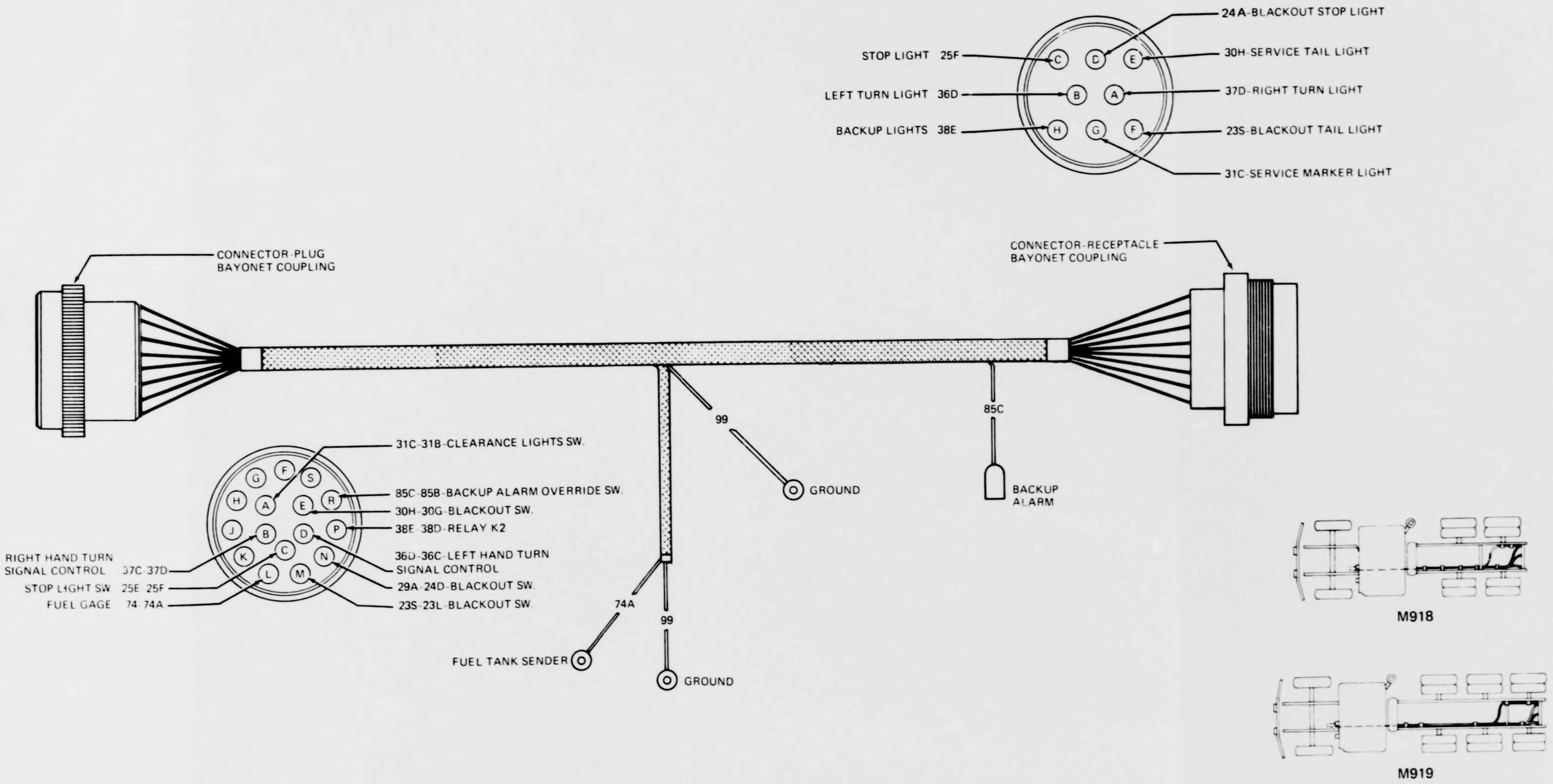
24A-BLACKOUT STOP LIGHT
STOP LIGHT 25F
30H-SERVICE TAIL LIGHT
LEFT TURN LIGHT 36D
37D-RIGHT TURN LIGHT
BACKUP LIGHTS 38E
23S-BLACKOUT TAIL LIGHT
31C-SERVICE MARKER LIGHT
C
D
E
B
A
H
G
F
CONNECTOR-PLUG
BAYONET COUPLING
CONNECTOR-RECEPTACLE
BAYONET COUPLING
99
85C
GROUND
BACKUP
ALARM
31C-31B-CLEARANCE LIGHTS SW.
85C-85B-BACKUP ALARM OVERRIDE SW.
30H-30G-BLACKOUT SW.
38E-38D-RELAY K2
36D-36C-LEFT HAND TURN
SIGNAL CONTROL
29A-24D-BLACKOUT SW.
23S-23L-BLACKOUT SW.
RIGHT HAND TURN
SIGNAL CONTROL 37C-37D
STOP LIGHT SW. 25E-25F
FUEL GAGE 74-74A
G
F
S
H
A
E
R
J
B
D
P
K
C
N
L
M
74A
99
FUEL TANK SENDER
GROUND
M918
M919

TA237257

Figure FO-8. Chassis Harness Assembly (M918 & M919).

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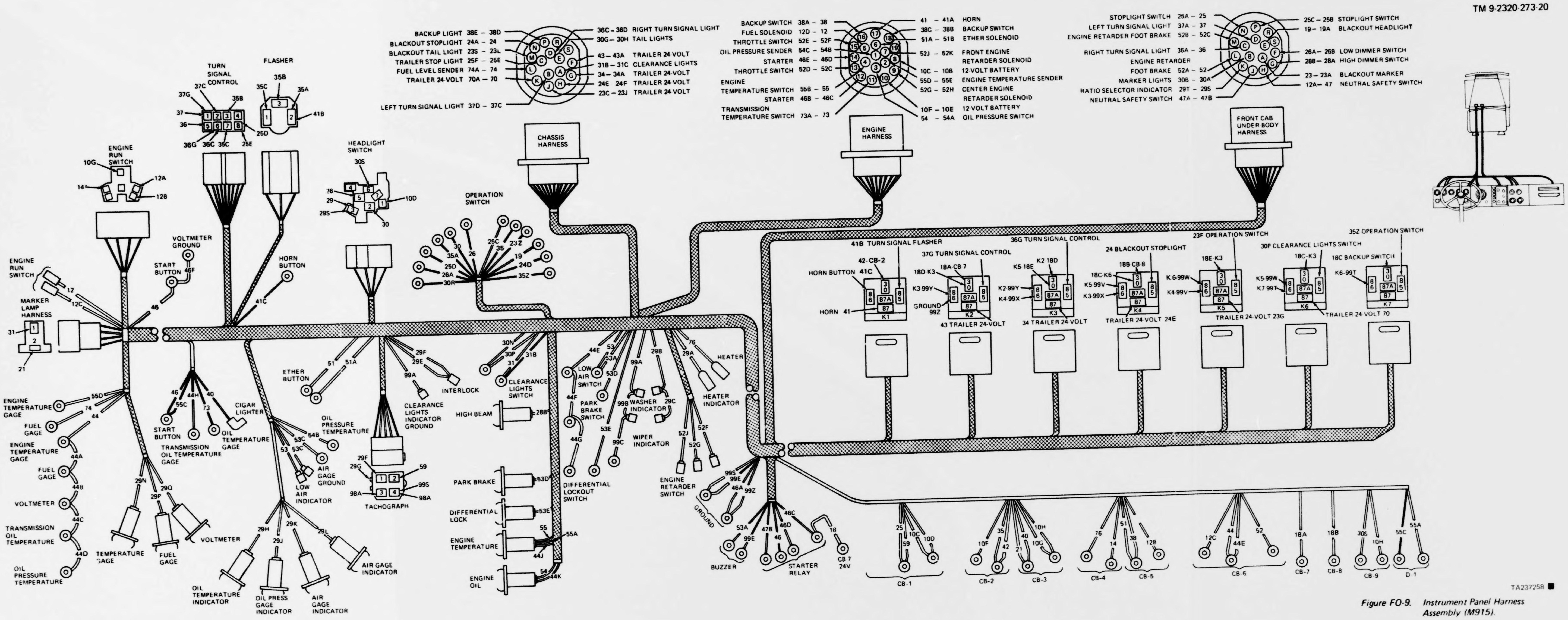
BACKUP LIGHT 38E – 38D
BLACKOUT STOPLIGHT 24A – 24
BLACKOUT TAIL LIGHT 23S – 23L
TRAILER STOP LIGHT 25F – 25E
FUEL LEVEL SENDER 74A – 74
TRAILER 24-VOLT 70A – 70
LEFT TURN SIGNAL LIGHT 37D – 37C
36C – 36D RIGHT TURN SIGNAL LIGHT
30G – 30H TAIL LIGHTS
43 – 43A TRAILER 24-VOLT
31B – 31C CLEARANCE LIGHTS
34 – 34A TRAILER 24-VOLT
24E 24F TRAILER 24-VOLT
23C – 23J TRAILER 24-VOLT
CHASSIS HARNESS
BACKUP SWITCH 38A – 38
FUEL SOLENOID 12D – 12
THROTTLE SWITCH 52E – 52F
OIL PRESSURE SENDER 54C – 54B
STARTER 46E – 46D
THROTTLE SWITCH 52D – 52C
ENGINE TEMPERATURE SWITCH 55B – 55
STARTER 46B – 46C
TRANSMISSION TEMPERATURE SWITCH 73A – 73
41 – 41A HORN
38C – 38B BACKUP SWITCH
51A – 51B ETHER SOLENOID
52J – 52K FRONT ENGINE RETARDER SOLENOID
10C – 10B 12-VOLT BATTERY
55D – 55E ENGINE TEMPERATURE SENDER
52G – 52H CENTER ENGINE RETARDER SOLENOID
10F – 10E 12-VOLT BATTERY
54 – 54A OIL PRESSURE SWITCH
ENGINE HARNESS
STOPLIGHT SWITCH 25A – 25
LEFT TURN SIGNAL LIGHT 37A – 37
ENGINE RETARDER FOOT BRAKE 52B – 52C
RIGHT TURN SIGNAL LIGHT 36A – 36
ENGINE RETARDER FOOT BRAKE 52A – 52
MARKER LIGHTS 30B – 30A
RATIO SELECTOR INDICATOR 29T – 29S
NEUTRAL SAFETY SWITCH 47A – 47B
25C – 25B STOPLIGHT SWITCH
19 – 19A BLACKOUT HEADLIGHT
26A – 26B LOW DIMMER SWITCH
28B – 28A HIGH DIMMER SWITCH
23 – 23A BLACKOUT MARKER
12A – 47 NEUTRAL SAFETY SWITCH
FRONT CAB UNDER BODY HARNESS
TURN SIGNAL CONTROL
FLASHER
ENGINE RUN SWITCH
HEADLIGHT SWITCH
OPERATION SWITCH
VOLTMETER GROUND
START BUTTON
HORN BUTTON
ENGINE RUN SWITCH
MARKER LAMP HARNESS
ENGINE TEMPERATURE GAGE
FUEL GAGE
ENGINE TEMPERATURE GAGE
FUEL GAGE
VOLTMETER
TRANSMISSION OIL TEMPERATURE
OIL PRESSURE TEMPERATURE
TEMPERATURE GAGE
FUEL GAGE
VOLTMETER
START BUTTON
TRANSMISSION OIL TEMPERATURE GAGE
OIL TEMPERATURE GAGE
CIGAR LIGHTER
ETHER BUTTON
OIL PRESSURE TEMPERATURE
AIR GAGE GROUND
LOW AIR INDICATOR
OIL TEMPERATURE INDICATOR
OIL PRESS GAGE INDICATOR
AIR GAGE INDICATOR
AIR GAGE INDICATOR
TACHOGRAPH
CLEARANCE LIGHTS INDICATOR GROUND
INTERLOCK
CLEARANCE LIGHTS SWITCH
HIGH BEAM
PARK BRAKE
DIFFERENTIAL LOCKOUT
ENGINE TEMPERATURE
ENGINE OIL
LOW AIR SWITCH
PARK BRAKE SWITCH
DIFFERENTIAL LOCKOUT SWITCH
WASHER INDICATOR
WIPER INDICATOR
HEATER
HEATER INDICATOR
ENGINE RETARDER SWITCH
GROUND
BUZZER
STARTER RELAY
CB-7 24V
41B TURN SIGNAL FLASHER
37G TURN SIGNAL CONTROL
36G TURN SIGNAL CONTROL
24 BLACKOUT STOPLIGHT
23F OPERATION SWITCH
30P CLEARANCE LIGHTS SWITCH
18C BACKUP SWITCH
35Z OPERATION SWITCH
HORN BUTTON 41C
HORN 41
GROUND 99Z
K1
K2
K3
K4
K5
K6
K7
43 TRAILER 24-VOLT
34 TRAILER 24-VOLT
TRAILER 24-VOLT 24E
TRAILER 24-VOLT 23G
TRAILER 24 VOLT 70
CB-1
CB-2
CB-3
CB-4
CB-5
CB-6
CB-7
CB-8
CB-9
D-1

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Figure FO-9. *Instrument Panel Harness Assembly (M915).*

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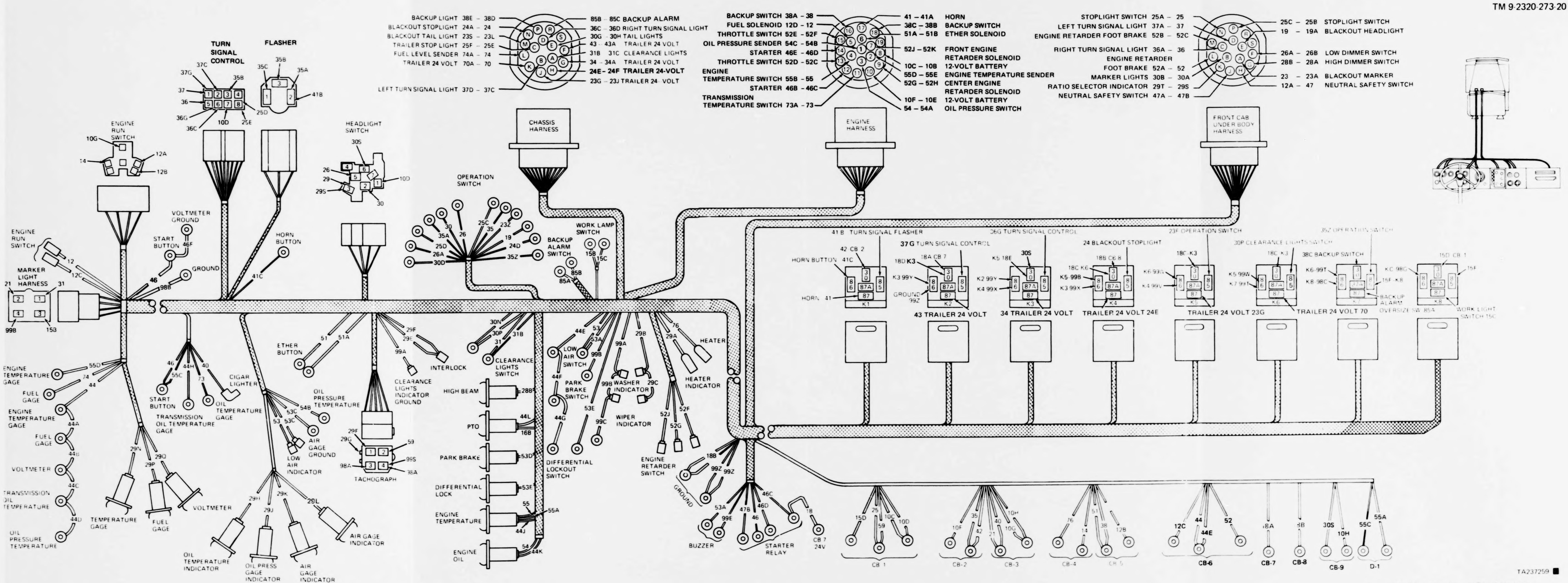
CHASSIS HARNESS
ENGINE HARNESS
FRONT CAB UNDER BODY HARNESS
TURN SIGNAL CONTROL
FLASHER
ENGINE RUN SWITCH
HEADLIGHT SWITCH
OPERATION SWITCH
WORK LAMP SWITCH
BACKUP ALARM SWITCH
MARKER LIGHT HARNESS
VOLTMETER GROUND
START BUTTON
HORN BUTTON
GROUND
BACKUP LIGHT 38E – 38D
BLACKOUT STOPLIGHT 24A – 24
BLACKOUT TAIL LIGHT 23S – 23L
TRAILER STOP LIGHT 25F – 25E
FUEL LEVEL SENDER 74A – 74
TRAILER 24 VOLT 70A – 70
LEFT TURN SIGNAL LIGHT 37D – 37C
85B – 85C BACKUP ALARM
36C – 36D RIGHT TURN SIGNAL LIGHT
30G – 30H TAIL LIGHTS
43 – 43A TRAILER 24 VOLT
31B – 31C CLEARANCE LIGHTS
34 – 34A TRAILER 24 VOLT
24E – 24F TRAILER 24-VOLT
23G – 23J TRAILER 24 VOLT
BACKUP SWITCH 38A – 38
FUEL SOLENOID 12D – 12
THROTTLE SWITCH 52E – 52F
OIL PRESSURE SENDER 54C – 54B
STARTER 46E – 46D
THROTTLE SWITCH 52D – 52C
ENGINE TEMPERATURE SWITCH 55B – 55
STARTER 46B – 46C
TRANSMISSION TEMPERATURE SWITCH 73A – 73
41 – 41A HORN
38C – 38B BACKUP SWITCH
51A – 51B ETHER SOLENOID
52J – 52K FRONT ENGINE RETARDER SOLENOID
10C – 10B 12-VOLT BATTERY
55D – 55E ENGINE TEMPERATURE SENDER
52G – 52H CENTER ENGINE RETARDER SOLENOID
10F – 10E 12-VOLT BATTERY
54 – 54A OIL PRESSURE SWITCH
STOPLIGHT SWITCH 25A – 25
LEFT TURN SIGNAL LIGHT 37A – 37
ENGINE RETARDER FOOT BRAKE 52B – 52C
RIGHT TURN SIGNAL LIGHT 36A – 36
ENGINE RETARDER FOOT BRAKE 52A – 52
MARKER LIGHTS 30B – 30A
RATIO SELECTOR INDICATOR 29T – 29S
NEUTRAL SAFETY SWITCH 47A – 47B
25C – 25B STOPLIGHT SWITCH
19 – 19A BLACKOUT HEADLIGHT
26A – 26B LOW DIMMER SWITCH
28B – 28A HIGH DIMMER SWITCH
23 – 23A BLACKOUT MARKER
12A – 47 NEUTRAL SAFETY SWITCH
41B TURN SIGNAL FLASHER
37G TURN SIGNAL CONTROL
36G TURN SIGNAL CONTROL
24 BLACKOUT STOPLIGHT
23F OPERATION SWITCH
30P CLEARANCE LIGHTS SWITCH
35Z OPERATION SWITCH
HORN BUTTON
HORN
K1
K2
K3
K4
K5
K6
K7
K8
43 TRAILER 24 VOLT
34 TRAILER 24 VOLT
TRAILER 24 VOLT 24E
TRAILER 24 VOLT 23G
TRAILER 24 VOLT 70
BACKUP ALARM OVERSIZE SW. 85A
WORK LIGHT SWITCH 15C
ENGINE TEMPERATURE GAGE
FUEL GAGE
VOLTMETER
TRANSMISSION OIL TEMPERATURE
OIL PRESSURE TEMPERATURE
TEMPERATURE GAGE
FUEL GAGE
TRANSMISSION OIL TEMPERATURE GAGE
OIL TEMPERATURE GAGE
CIGAR LIGHTER
ETHER BUTTON
OIL PRESSURE TEMPERATURE
AIR GAGE GROUND
LOW AIR INDICATOR
OIL TEMPERATURE INDICATOR
OIL PRESS GAGE INDICATOR
AIR GAGE INDICATOR
AIR GAGE INDICATOR
INTERLOCK
CLEARANCE LIGHTS INDICATOR GROUND
TACHOGRAPH
CLEARANCE LIGHTS SWITCH
HIGH BEAM
PTO
PARK BRAKE
DIFFERENTIAL LOCK
ENGINE TEMPERATURE
ENGINE OIL
LOW AIR SWITCH
PARK BRAKE SWITCH
DIFFERENTIAL LOCKOUT SWITCH
WASHER INDICATOR
WIPER INDICATOR
HEATER
HEATER INDICATOR
ENGINE RETARDER SWITCH
GROUND
BUZZER
STARTER RELAY
CB-7 24V
CB-1
CB-2
CB-3
CB-4
CB-5
CB-6
CB-7
CB-8
CB-9
D-1
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Figure FO-10. Instrument Panel Harness Assembly (M916 and M920).

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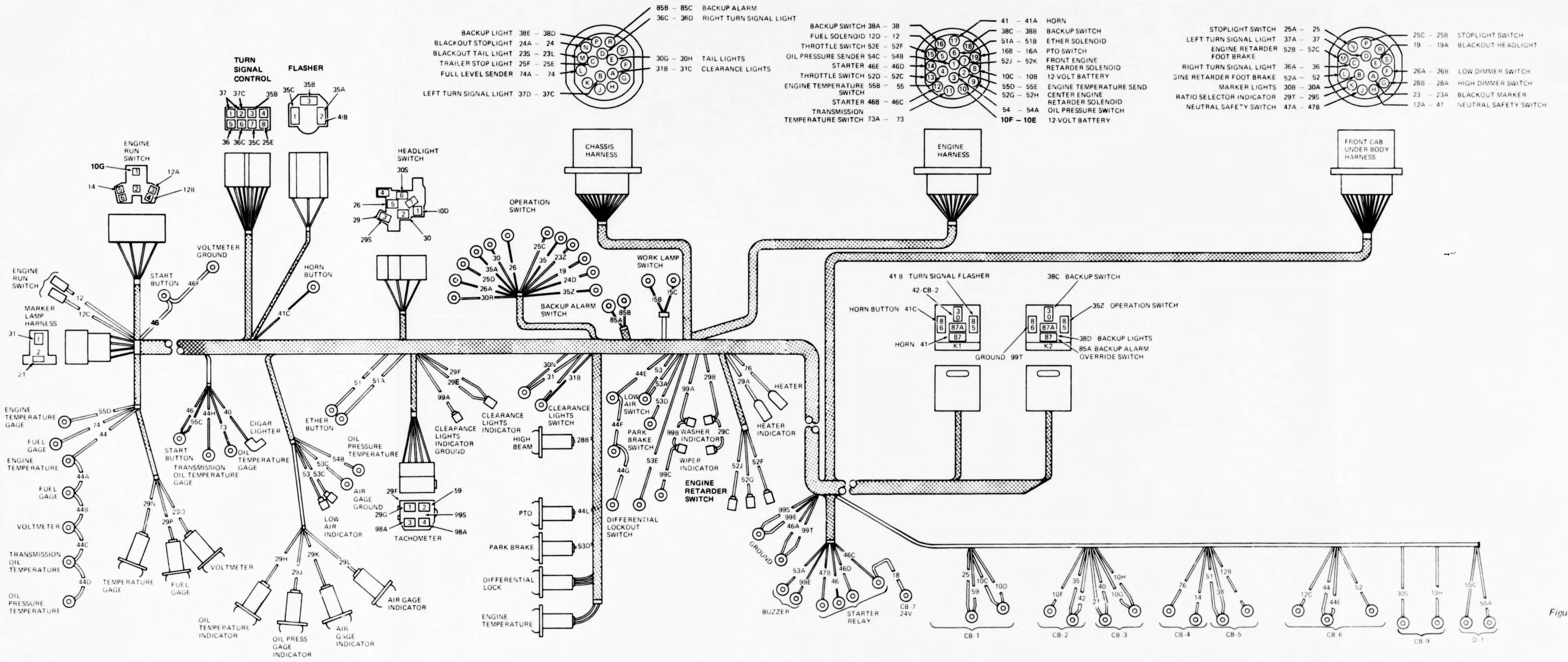
85B – 85C BACKUP ALARM
36C – 36D RIGHT TURN SIGNAL LIGHT
BACKUP LIGHT 38E – 38D
BLACKOUT STOPLIGHT 24A – 24
BLACKOUT TAIL LIGHT 23S – 23L
TRAILER STOP LIGHT 25F – 25E
FULL LEVEL SENDER 74A – 74
LEFT TURN SIGNAL LIGHT 37D – 37C
30G – 30H TAIL LIGHTS
31B – 31C CLEARANCE LIGHTS
P
R
N
S
D
M
E
C
F
L
A
B
G
K
H
J
CHASSIS HARNESS
BACKUP SWITCH 38A – 38
FUEL SOLENOID 12D – 12
THROTTLE SWITCH 52E – 52F
OIL PRESSURE SENDER 54C – 54B
STARTER 46E – 46D
THROTTLE SWITCH 52D – 52C
ENGINE TEMPERATURE SWITCH 55B – 55
STARTER 46B – 46C
TRANSMISSION TEMPERATURE SWITCH 73A – 73
41 – 41A HORN
38C – 38B BACKUP SWITCH
51A – 51B ETHER SOLENOID
16B – 16A PTO SWITCH
52J – 52K FRONT ENGINE RETARDER SOLENOID
10C – 10B 12 VOLT BATTERY
55D – 55E ENGINE TEMPERATURE SEND
52G – 52H CENTER ENGINE RETARDER SOLENOID
54 – 54A OIL PRESSURE SWITCH
10F – 10E 12 VOLT BATTERY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
ENGINE HARNESS
STOPLIGHT SWITCH 25A – 25
LEFT TURN SIGNAL LIGHT 37A – 37
ENGINE RETARDER FOOT BRAKE 52B – 52C
RIGHT TURN SIGNAL LIGHT 36A – 36
GINE RETARDER FOOT BRAKE 52A – 52
MARKER LIGHTS 30B – 30A
RATIO SELECTOR INDICATOR 29T – 29S
NEUTRAL SAFETY SWITCH 47A – 47B
25C – 25B STOPLIGHT SWITCH
19 – 19A BLACKOUT HEADLIGHT
26A – 26B LOW DIMMER SWITCH
28B – 28A HIGH DIMMER SWITCH
23 – 23A BLACKOUT MARKER
12A – 47 NEUTRAL SAFETY SWITCH
V
FRONT CAB UNDER BODY HARNESS
TURN SIGNAL CONTROL
37
37C
35B
1
2
3
4
5
6
7
8
36
36C
35C
25E
FLASHER
35C
35B
35A
3
1
2
41B
ENGINE RUN SWITCH
10G
12A
14
12B
1
2
3
4
5
6
HEADLIGHT SWITCH
30S
26
29
29S
10D
30
1
2
3
4
5
6
7
OPERATION SWITCH
30
35A
25D
26A
30R
26
25C
35
23Z
19
24D
35Z
BACKUP ALARM SWITCH
85A
85B
WORK LAMP SWITCH
15B
15C
ENGINE RUN SWITCH
12
12C
MARKER LAMP HARNESS
31
1
2
21
VOLTMETER GROUND
START BUTTON
46F
46
HORN BUTTON
41C
ENGINE TEMPERATURE GAGE
55D
74
44
FUEL GAGE
ENGINE TEMPERATURE
44A
FUEL GAGE
44B
VOLTMETER
44C
TRANSMISSION OIL TEMPERATURE
44D
OIL PRESSURE TEMPERATURE
29N
29P
29O
TEMPERATURE GAGE
FUEL GAGE
VOLTMETER
46
55C
44H
40
73
START BUTTON
TRANSMISSION OIL TEMPERATURE GAGE
OIL TEMPERATURE GAGE
CIGAR LIGHTER
51
51A
ETHER BUTTON
OIL PRESSURE TEMPERATURE
54B
53C
53
53C
AIR GAGE GROUND
LOW AIR INDICATOR
29H
29J
29K
29L
OIL TEMPERATURE INDICATOR
OIL PRESS GAGE INDICATOR
AIR GAGE INDICATOR
AIR GAGE INDICATOR
29F
29E
99A
CLEARANCE LIGHTS INDICATOR GROUND
CLEARANCE LIGHTS INDICATOR
29F
59
29G
99S
98A
98A
1
2
3
4
TACHOMETER
30N
31
31B
CLEARANCE LIGHTS SWITCH
HIGH BEAM
28B
PTO
44L
PARK BRAKE
53D
DIFFERENTIAL LOCK
ENGINE TEMPERATURE
44E
53
53A
53D
LOW AIR SWITCH
44F
PARK BRAKE SWITCH
44G
DIFFERENTIAL LOCKOUT SWITCH
53E
99A
99B
99C
29B
29C
WASHER INDICATOR
WIPER INDICATOR
ENGINE RETARDER SWITCH
52J
52G
52F
29A
76
HEATER
HEATER INDICATOR
41 B TURN SIGNAL FLASHER
42-CB-2
HORN BUTTON 41C
HORN 41
30
86
87A
85
87
K1
38C BACKUP SWITCH
35Z OPERATION SWITCH
38D BACKUP LIGHTS
85A BACKUP ALARM OVERRIDE SWITCH
GROUND 99T
K2
99S
99E
46A
99T
GROUND
53A
99E
47B
46
46D
46C
18
BUZZER
STARTER RELAY
CB-7 24V
25
59
10C
10D
CB-1
10F
35
42
21
40
10G
10H
CB-2
CB-3
76
14
51
38
12B
CB-4
CB-5
12C
44
44E
52
CB-6
30S
10H
CB-9
55C
55A
D-1

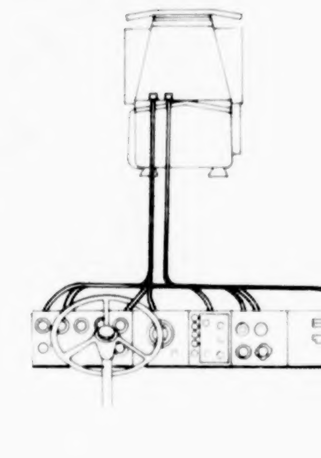

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Figure FO-11. Instrument Panel Harness Assembly (M917, M918 and M919).

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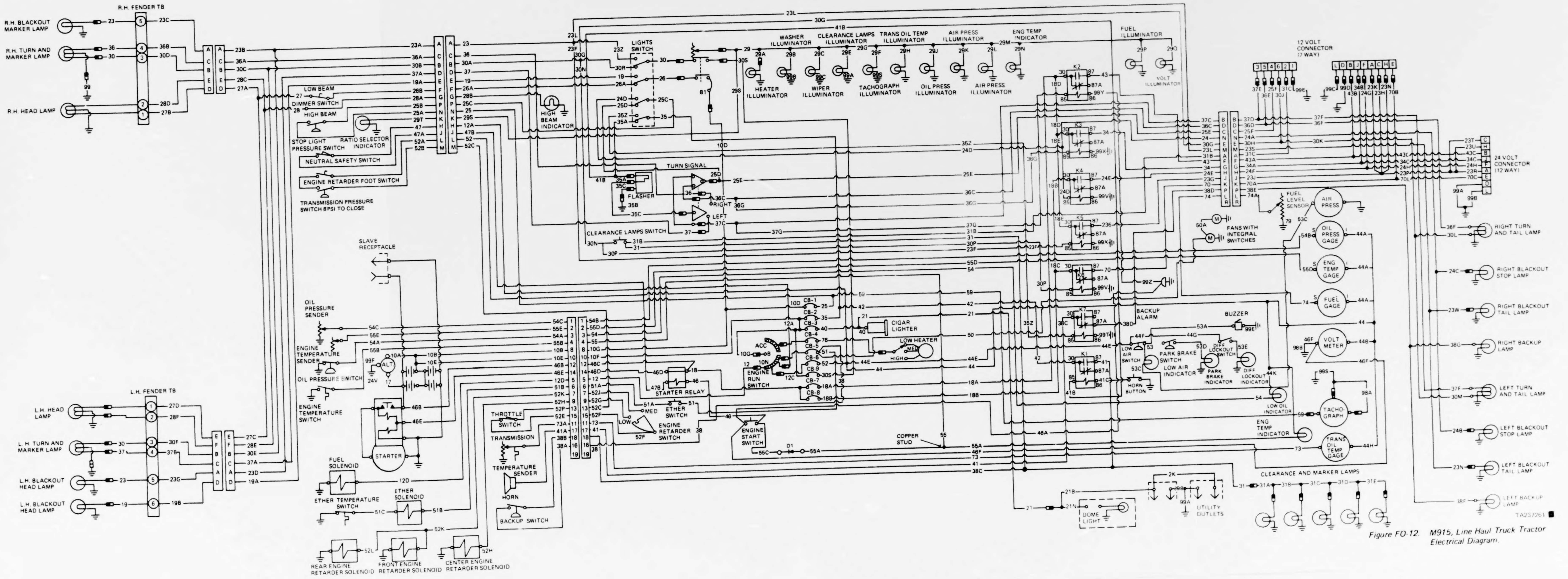
R.H. BLACKOUT MARKER LAMP
R.H. TURN AND MARKER LAMP
R.H. HEAD LAMP
R.H. FENDER TB
LOW BEAM
DIMMER SWITCH
HIGH BEAM
STOP LIGHT PRESSURE SWITCH
RATIO SELECTOR INDICATOR
NEUTRAL SAFETY SWITCH
ENGINE RETARDER FOOT SWITCH
TRANSMISSION PRESSURE SWITCH 8PSI TO CLOSE
HIGH BEAM INDICATOR
LIGHTS SWITCH
TURN SIGNAL
FLASHER
RIGHT
LEFT
CLEARANCE LAMPS SWITCH
HEATER ILLUMINATOR
WASHER ILLUMINATOR
WIPER ILLUMINATOR
CLEARANCE LAMPS ILLUMINATOR
TACHOGRAPH ILLUMINATOR
TRANS OIL TEMP ILLUMINATOR
OIL PRESS ILLUMINATOR
AIR PRESS ILLUMINATOR
ENG TEMP INDICATOR
FUEL ILLUMINATOR
VOLT ILLUMINATOR
12 VOLT CONNECTOR (7 WAY)
24 VOLT CONNECTOR (12 WAY)
SLAVE RECEPTACLE
OIL PRESSURE SENDER
ENGINE TEMPERATURE SENDER
OIL PRESSURE SWITCH
ENGINE TEMPERATURE SWITCH
ALT
24V
STARTER
FUEL SOLENOID
ETHER TEMPERATURE SWITCH
ETHER SOLENOID
REAR ENGINE RETARDER SOLENOID
FRONT ENGINE RETARDER SOLENOID
CENTER ENGINE RETARDER SOLENOID
THROTTLE SWITCH
TRANSMISSION TEMPERATURE SENDER
HORN
BACKUP SWITCH
STARTER RELAY
ETHER SWITCH
LOW
MED
ENGINE RETARDER SWITCH
ENGINE START SWITCH
ENGINE RUN SWITCH
ACC
CB-1
CB-2
CB-3
CB-4
CB-5
CB-6
CB-7
CB-8
CIGAR LIGHTER
LOW HEATER
MED
HIGH
COPPER STUD
K1
K2
K3
K4
K5
K6
K7
BACKUP ALARM
BUZZER
LOW AIR SWITCH
PARK BRAKE SWITCH
LOW AIR INDICATOR
PARK BRAKE INDICATOR
DIFF LOCKOUT SWITCH
DIFF LOCKOUT INDICATOR
HORN BUTTON
LOW OIL INDICATOR
ENG TEMP INDICATOR
FUEL LEVEL SENSOR
FANS WITH INTEGRAL SWITCHES
AIR PRESS
OIL PRESS GAGE
ENG TEMP GAGE
FUEL GAGE
VOLT METER
TACHO-GRAPH
TRANS OIL TEMP GAGE
CLEARANCE AND MARKER LAMPS
DOME LIGHT
UTILITY OUTLETS
RIGHT TURN AND TAIL LAMP
RIGHT BLACKOUT STOP LAMP
RIGHT BLACKOUT TAIL LAMP
RIGHT BACKUP LAMP
LEFT TURN AND TAIL LAMP
LEFT BLACKOUT STOP LAMP
LEFT BLACKOUT TAIL LAMP
LEFT BACKUP LAMP
L.H. HEAD LAMP
L.H. TURN AND MARKER LAMP
L.H. BLACKOUT HEAD LAMP
L.H. BLACKOUT HEAD LAMP
L.H. FENDER TB
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Figure FO-12. M915, Line Haul Truck Tractor Electrical Diagram.

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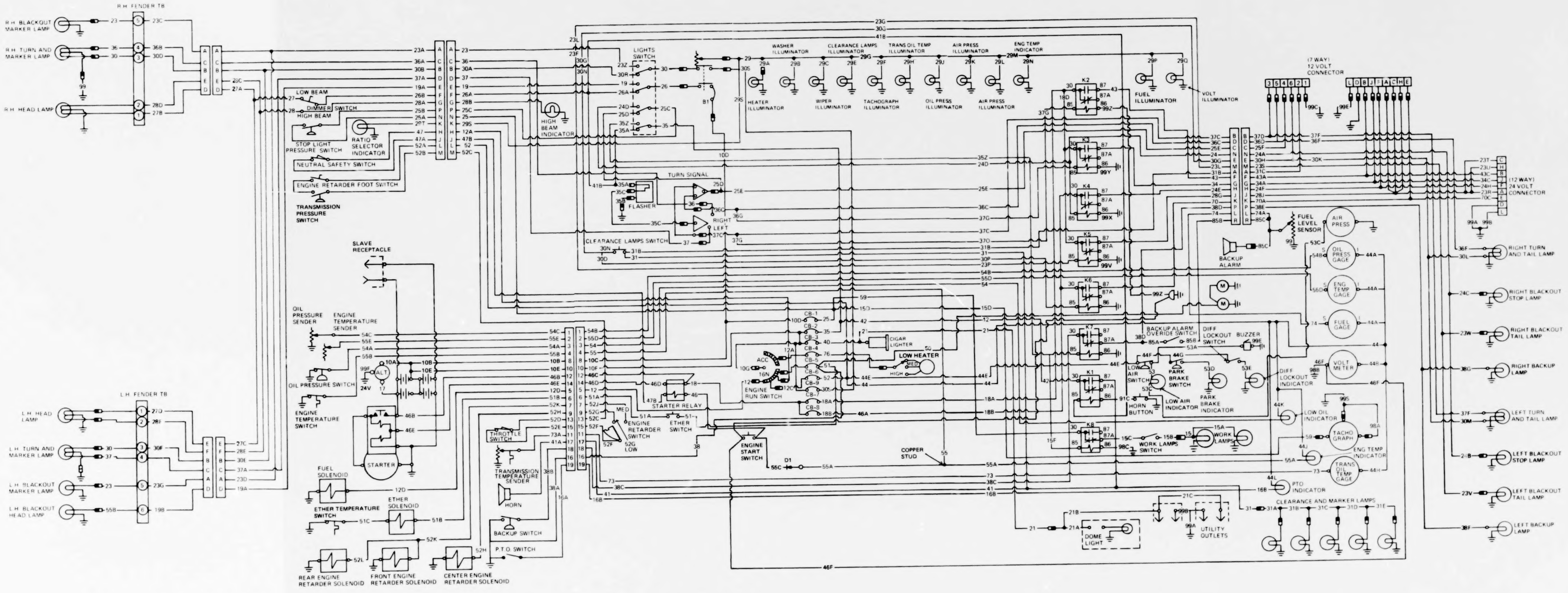
R.H. FENDER TB
R.H. BLACKOUT MARKER LAMP
R.H. TURN AND MARKER LAMP
R.H. HEAD LAMP
LOW BEAM
DIMMER SWITCH
HIGH BEAM
STOP LIGHT PRESSURE SWITCH
RATIO SELECTOR INDICATOR
NEUTRAL SAFETY SWITCH
ENGINE RETARDER FOOT SWITCH
TRANSMISSION PRESSURE SWITCH
SLAVE RECEPTACLE
OIL PRESSURE SENDER
ENGINE TEMPERATURE SENDER
OIL PRESSURE SWITCH
ALT
24V
ENGINE TEMPERATURE SWITCH
STARTER
FUEL SOLENOID
ETHER TEMPERATURE SWITCH
ETHER SOLENOID
REAR ENGINE RETARDER SOLENOID
FRONT ENGINE RETARDER SOLENOID
CENTER ENGINE RETARDER SOLENOID
L.H. FENDER TB
L.H. HEAD LAMP
L.H. TURN AND MARKER LAMP
L.H. BLACKOUT MARKER LAMP
L.H. BLACKOUT HEAD LAMP
THROTTLE SWITCH
TRANSMISSION TEMPERATURE SENDER
HORN
BACKUP SWITCH
P.T.O. SWITCH
HIGH BEAM INDICATOR
LIGHTS SWITCH
TURN SIGNAL
FLASHER
RIGHT
LEFT
CLEARANCE LAMPS SWITCH
STARTER RELAY
ENGINE RETARDER SWITCH
MED
LOW
ETHER SWITCH
ENGINE START SWITCH
D1
COPPER STUD
ACC
ENGINE RUN SWITCH
CB-1
CB-2
CB-3
CB-4
CB-5
CB-6
CB-9
CB-7
CB-8
CIGAR LIGHTER
LOW HEATER
HIGH
WASHER ILLUMINATOR
CLEARANCE LAMPS ILLUMINATOR
TRANS OIL TEMP ILLUMINATOR
AIR PRESS ILLUMINATOR
ENG TEMP INDICATOR
HEATER ILLUMINATOR
WIPER ILLUMINATOR
TACHOGRAPH ILLUMINATOR
OIL PRESS ILLUMINATOR
AIR PRESS ILLUMINATOR
FUEL ILLUMINATOR
VOLT ILLUMINATOR
K1
K2
K3
K4
K5
K6
K7
K8
(7 WAY) 12 VOLT CONNECTOR
(12 WAY) 24 VOLT CONNECTOR
FUEL LEVEL SENSOR
AIR PRESS
OIL PRESS GAGE
ENG TEMP GAGE
FUEL GAGE
VOLT METER
BACKUP ALARM
BACKUP ALARM OVERIDE SWITCH
DIFF LOCKOUT SWITCH
BUZZER
LOW AIR SWITCH
PARK BRAKE SWITCH
PARK BRAKE INDICATOR
DIFF LOCKOUT INDICATOR
HORN BUTTON
LOW AIR INDICATOR
LOW OIL INDICATOR
TACHOGRAPH
ENG TEMP INDICATOR
TRANS OIL TEMP GAGE
PTO INDICATOR
WORK LAMPS SWITCH
WORK LAMPS
DOME LIGHT
UTILITY OUTLETS
CLEARANCE AND MARKER LAMPS
RIGHT TURN AND TAIL LAMP
RIGHT BLACKOUT STOP LAMP
RIGHT BLACKOUT TAIL LAMP
RIGHT BACKUP LAMP
LEFT TURN AND TAIL LAMP
LEFT BLACKOUT STOP LAMP
LEFT BLACKOUT TAIL LAMP
LEFT BACKUP LAMP

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Figure FO-13. M916 Light Equipment and M920 Medium Equipment Transporter Truck Tractor Electrical Diagram.

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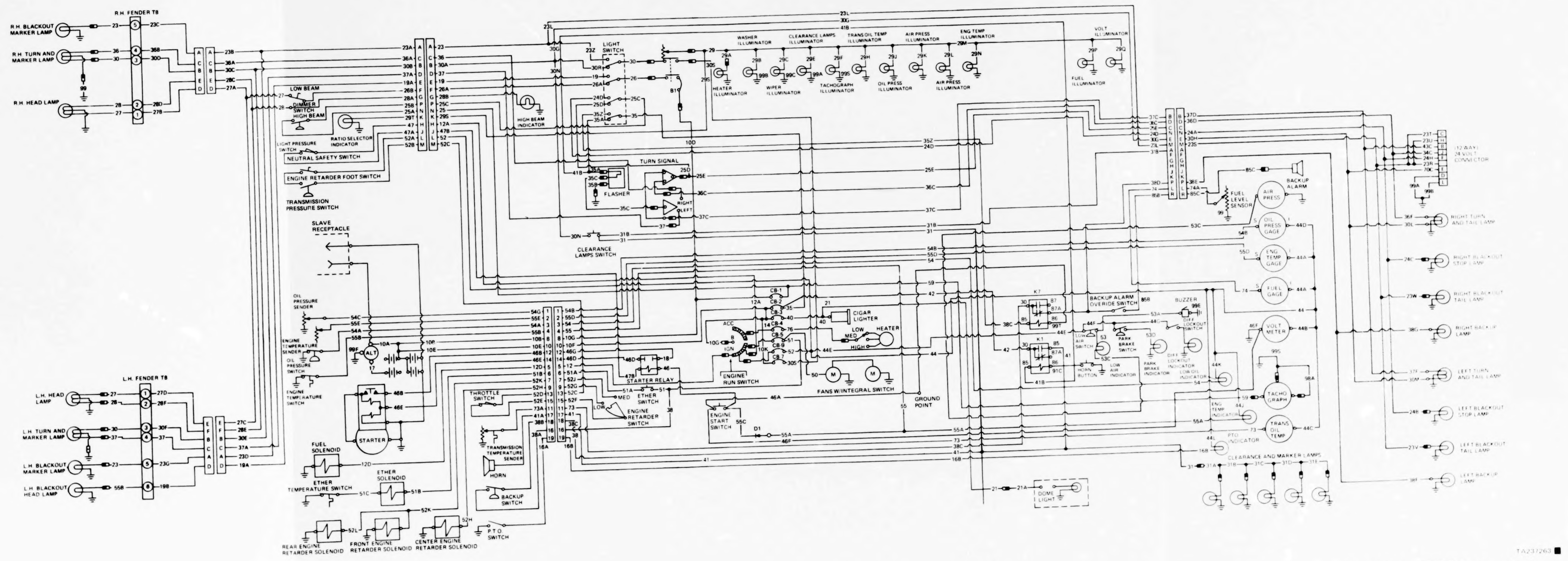
R.H. FENDER TB
R.H. BLACKOUT MARKER LAMP
R.H. TURN AND MARKER LAMP
R.H. HEAD LAMP
LOW BEAM
DIMMER SWITCH
HIGH BEAM
RATIO SELECTOR INDICATOR
LIGHT PRESSURE SWITCH
NEUTRAL SAFETY SWITCH
ENGINE RETARDER FOOT SWITCH
TRANSMISSION PRESSURE SWITCH
HIGH BEAM INDICATOR
LIGHT SWITCH
TURN SIGNAL
FLASHER
RIGHT
LEFT
CLEARANCE LAMPS SWITCH
HEATER ILLUMINATOR
WASHER ILLUMINATOR
WIPER ILLUMINATOR
CLEARANCE LAMPS ILLUMINATOR
TACHOGRAPH ILLUMINATOR
TRANS OIL TEMP ILLUMINATOR
OIL PRESS ILLUMINATOR
AIR PRESS ILLUMINATOR
ENG TEMP ILLUMINATOR
VOLT ILLUMINATOR
FUEL ILLUMINATOR
SLAVE RECEPTACLE
OIL PRESSURE SENDER
ENGINE TEMPERATURE SENDER
OIL PRESSURE SWITCH
ENGINE TEMPERATURE SWITCH
ALT
STARTER
FUEL SOLENOID
ETHER TEMPERATURE SWITCH
ETHER SOLENOID
REAR ENGINE RETARDER SOLENOID
FRONT ENGINE RETARDER SOLENOID
CENTER ENGINE RETARDER SOLENOID
THROTTLE SWITCH
TRANSMISSION TEMPERATURE SENDER
HORN
BACKUP SWITCH
P.T.O. SWITCH
STARTER RELAY
ETHER SWITCH
ENGINE RETARDER SWITCH
ENGINE RUN SWITCH
ENGINE START SWITCH
CIGAR LIGHTER
HEATER
FANS W/INTEGRAL SWITCH
GROUND POINT
DOME LIGHT
K1
K7
BACKUP ALARM OVERRIDE SWITCH
BUZZER
HORN BUTTON
LOW AIR SWITCH
PARK BRAKE SWITCH
LOW AIR INDICATOR
PARK BRAKE INDICATOR
DIFF LOCKOUT SWITCH
DIFF LOCKOUT INDICATOR
LOW OIL INDICATOR
ENG TEMP INDICATOR
PTO INDICATOR
FUEL LEVEL SENSOR
BACKUP ALARM
AIR PRESS
OIL PRESS GAGE
ENG TEMP GAGE
FUEL GAGE
VOLT METER
TACHOGRAPH
TRANS OIL TEMP
CLEARANCE AND MARKER LAMPS
12 WAY 24 VOLT CONNECTOR
RIGHT TURN AND TAIL LAMP
RIGHT BLACKOUT STOP LAMP
RIGHT BLACKOUT TAIL LAMP
RIGHT BACKUP LAMP
LEFT TURN AND TAIL LAMP
LEFT BLACKOUT STOP LAMP
LEFT BLACKOUT TAIL LAMP
LEFT BACKUP LAMP
L.H. FENDER TB
L.H. HEAD LAMP
L.H. TURN AND MARKER LAMP
L.H. BLACKOUT MARKER LAMP
L.H. BLACKOUT HEAD LAMP
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Figure FO-14. M917, 20-Ton Dump Truck Chassis Electrical Diagram.

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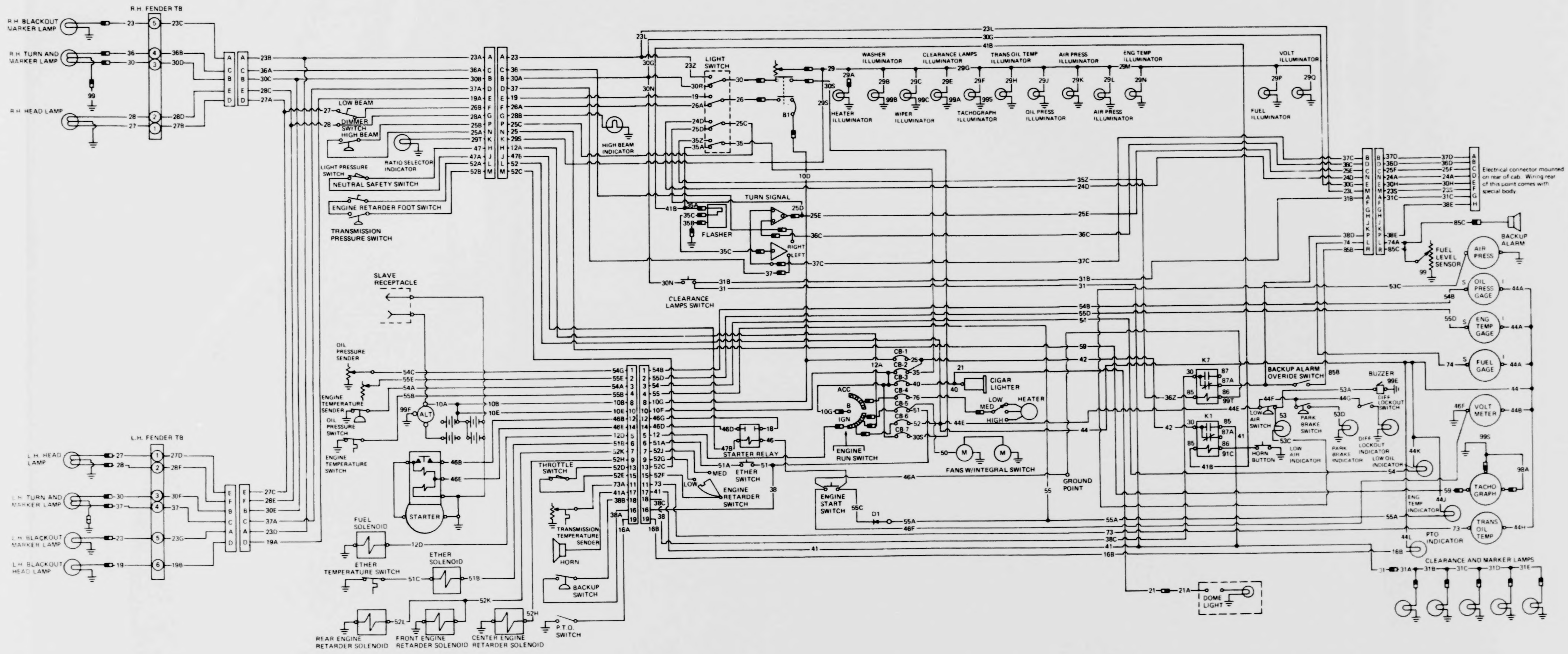
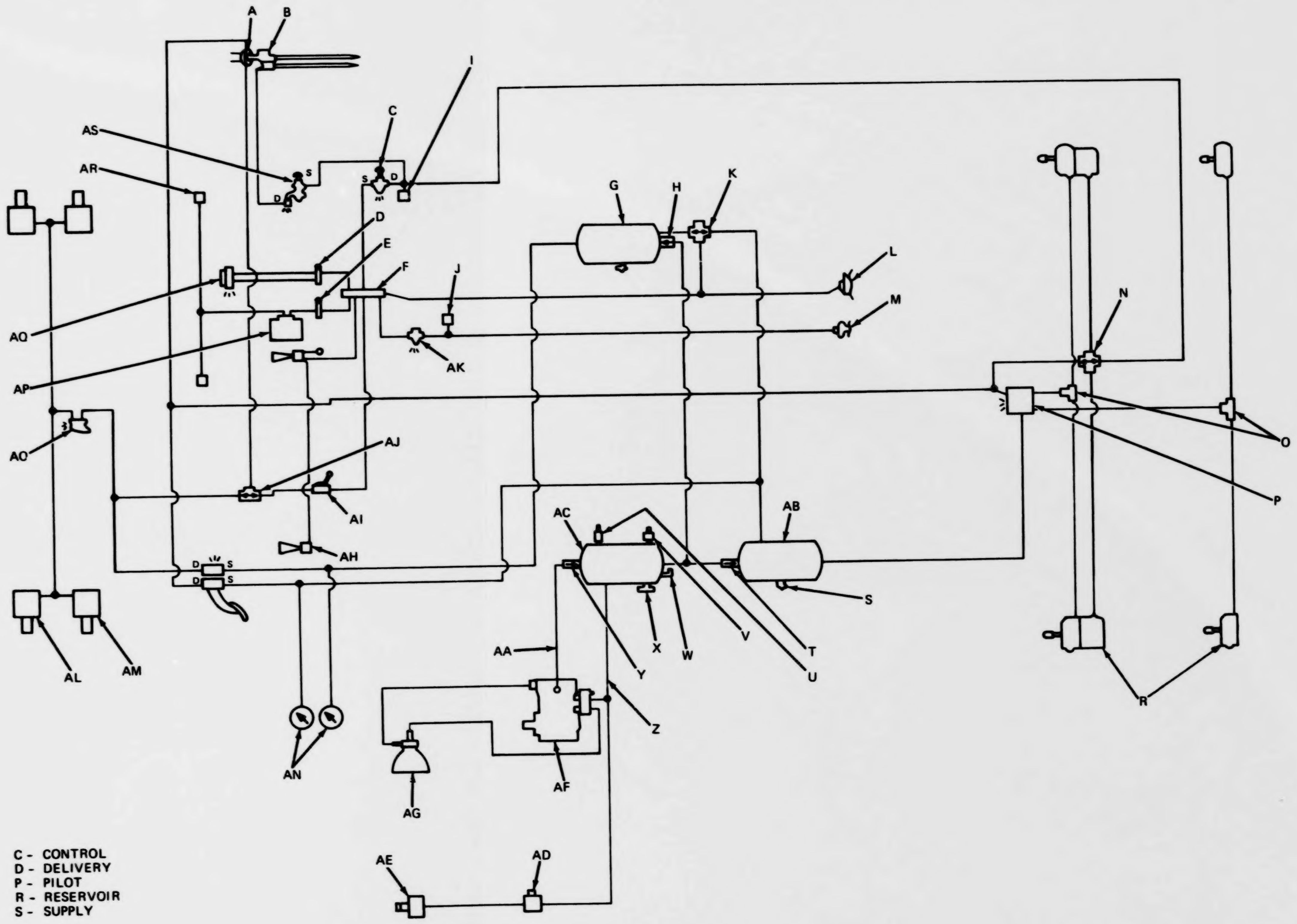

R.H. FENDER TB
R.H. BLACKOUT MARKER LAMP
R.H. TURN AND MARKER LAMP
R.H. HEAD LAMP
LOW BEAM
DIMMER SWITCH
HIGH BEAM
RATIO SELECTOR INDICATOR
LIGHT PRESSURE SWITCH
NEUTRAL SAFETY SWITCH
ENGINE RETARDER FOOT SWITCH
TRANSMISSION PRESSURE SWITCH
HIGH BEAM INDICATOR
LIGHT SWITCH
WASHER ILLUMINATOR
CLEARANCE LAMPS ILLUMINATOR
TRANS OIL TEMP ILLUMINATOR
AIR PRESS ILLUMINATOR
ENG TEMP ILLUMINATOR
VOLT ILLUMINATOR
HEATER ILLUMINATOR
WIPER ILLUMINATOR
TACHOGRAPH ILLUMINATOR
OIL PRESS ILLUMINATOR
AIR PRESS ILLUMINATOR
FUEL ILLUMINATOR
TURN SIGNAL
FLASHER
RIGHT
LEFT
CLEARANCE LAMPS SWITCH
SLAVE RECEPTACLE
OIL PRESSURE SENDER
ENGINE TEMPERATURE SENDER
OIL PRESSURE SWITCH
ENGINE TEMPERATURE SWITCH
ALT
STARTER
STARTER RELAY
ETHER SWITCH
MED
LOW
ENGINE RETARDER SWITCH
THROTTLE SWITCH
TRANSMISSION TEMPERATURE SENDER
HORN
BACKUP SWITCH
P.T.O. SWITCH
FUEL SOLENOID
ETHER TEMPERATURE SWITCH
ETHER SOLENOID
REAR ENGINE RETARDER SOLENOID
FRONT ENGINE RETARDER SOLENOID
CENTER ENGINE RETARDER SOLENOID
L.H. FENDER TB
L.H. HEAD LAMP
L.H. TURN AND MARKER LAMP
L.H. BLACKOUT MARKER LAMP
L.H. BLACKOUT HEAD LAMP
ACC
B
IGN
ENGINE RUN SWITCH
ENGINE START SWITCH
D1
CB-1
CB-2
CB-3
CB-4
CB-5
CB 6
CB 7
CIGAR LIGHTER
LOW
MED
HIGH
HEATER
FANS W/INTEGRAL SWITCH
GROUND POINT
K7
K1
BACKUP ALARM OVERIDE SWITCH
BUZZER
LOW AIR SWITCH
PARK BRAKE SWITCH
DIFF LOCKOUT SWITCH
HORN BUTTON
LOW AIR INDICATOR
PARK BRAKE INDICATOR
DIFF LOCKOUT INDICATOR
LOW OIL INDICATOR
ENG TEMP INDICATOR
PTO INDICATOR
DOME LIGHT
CLEARANCE AND MARKER LAMPS
BACKUP ALARM
FUEL LEVEL SENSOR
AIR PRESS
OIL PRESS GAGE
ENG TEMP GAGE
FUEL GAGE
VOLT METER
TACHO GRAPH
TRANS OIL TEMP
TA237264

Electrical connector mounted on rear of cab. Wiring rear of this point comes with special body.

Figure FO-15. M918 Bituminous Distributor and M919 Concrete Mobile Mixer Truck Chassis Electrical Diagram.

best copy available



C - CONTROL
D - DELIVERY
P - PILOT
R - RESERVOIR
S - SUPPLY

A	DOUBLE-CHECK STOPLIGHT	X	AUTOMATIC DRAIN VALVE
B	TRACTOR PROTECTION VALVE	Y	CHECK VALVE
C	PARK BRAKE VALVE	Z	GOVERNOR LINE
D	WIPER SWITCH	AA	DISCHARGE LINE
E	WASHER SWITCH	AB	PRIMARY RESERVOIR (REAR)
F	MANIFOLD	AC	SUPPLY RESERVOIR (WET)
G	SECONDARY RESERVOIR (FRONT)	AD	THERMOSTAT
H	CHECK VALVE	AE	FAN CLUTCH
I	PRESSURE SWITCH	AF	AIR COMPRESSOR
J	PRESSURE SWITCH--PARK ON	AG	ALCOHOL COMPRESSOR
K	DOUBLE-CHECK	AH	HORN TYPICAL
L	TRANSMISSION	AI	HAND CONTROL TRAILER BRAKE
M	DIFFERENTIAL LOCK	AJ	DOUBLE-CHECK
N	QUICK-RELEASE DOUBLE-CHECK VALVE	AK	DIFFERENTIAL LOCK SWITCH
O	QUICK-RELEASE VALVE	AL	WEDGE CHAMBER TYPICAL
P	RELAY VALVE	AM	DUAL BRAKE VALVE
R	SPRING BRAKE CHAMBER–TYPICAL	AN	AIR GAGES
S	MANUAL DRAIN VALVE–TYPICAL	AO	RATIO VALVE
T	CHECK VALVE	AP	WASHER BOTTLE
U	SAFETY VALVE	AQ	WIPER MOTOR
V	LOW PRESSURE	AR	WASHER NOZZLE–TYPICAL
W	COUPLER–AIR FILL	AS	TRAILER SUPPLY VALVE

TA 074525

Figure FO-16. M915 Tractor Schematic Diagram.

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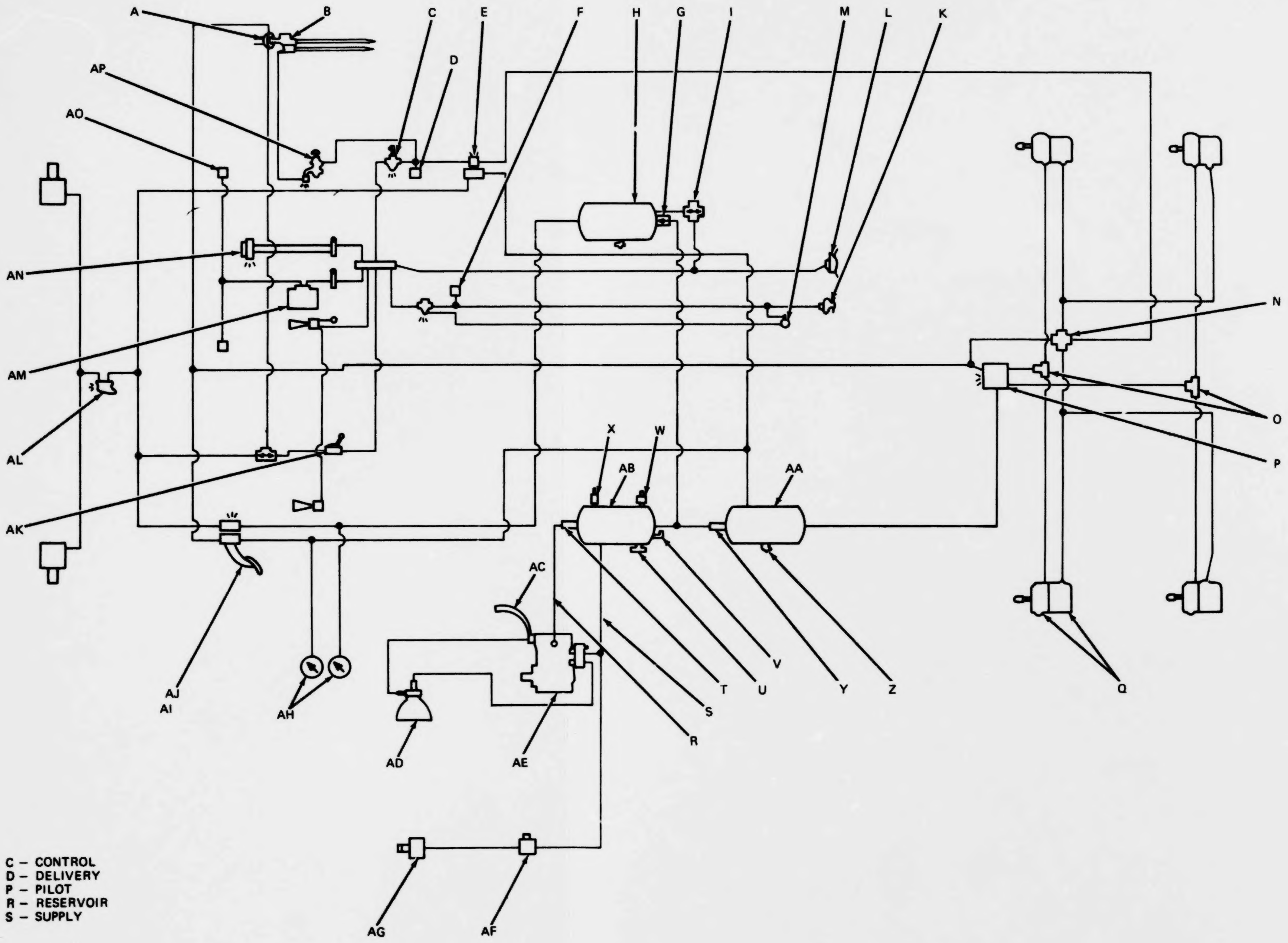

C – CONTROL
D – DELIVERY
P – PILOT
R – RESERVOIR
S – SUPPLY

A	DOUBLE-CHECK STOPLIGHT
B	TRACTOR PROTECTION VALVE
C	PARK BRAKE VALVE
D	PRESSURE SWITCH – PARK ON
E	SPRING BRAKE CONTROL VALVE
F	PRESSURE SWITCH – D/L LOCK ON FRT DRIVE IN
G	CHECK VALVE
H	SECONDARY RESERVOIR (FRONT)
I	DOUBLE-CHECK
J	FRONT AXLE DRIVE SWITCH AND DIFFERENTIAL LOCK
K	TRANSFER CASE
L	DIFFERENTIAL LOCK
M	TRANSMISSION
N	QUICK-RELEASE DOUBLE-CHECK VALVE
O	QUICK-RELEASE VALVE
P	RELAY VALVE
Q	SPRING BRAKE CHAMBER – TYPICAL
R	DISCHARGE LINE
S	GOVERNOR LINE
T	CHECK VALVE
U	AUTOMATIC DRAIN VALVE
V	COUPLER – AIR FILL
W	LOW PRESSURE
X	SAFETY VALVE
Y	CHECK VALVE
Z	MANUAL DRAIN VALVE
AA	PRIMARY RESERVOIR (REAR)
AB	SUPPLY RESERVOIR (WET)
AC	AIR INLET HOSE
AD	ALCOHOL ASPIRATOR
AE	AIR COMPRESSOR
AF	THERMOSTAT
AG	FAN CLUTCH
AH	AIR GAGES
AI	DUAL BRAKE VALVE
AJ	WEDGE CHAMBER – TYPICAL
AK	HAND CONTROL TRAILER BRAKE
AL	RATIO VALVE
AM	WASHER BOTTLE
AN	WIPER MOTOR
AO	WASHER NOZZLE – TYPICAL
AP	TRAILER SUPPLY VALVE

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Figure FO-17. M916 Tractor Schematic Diagram.

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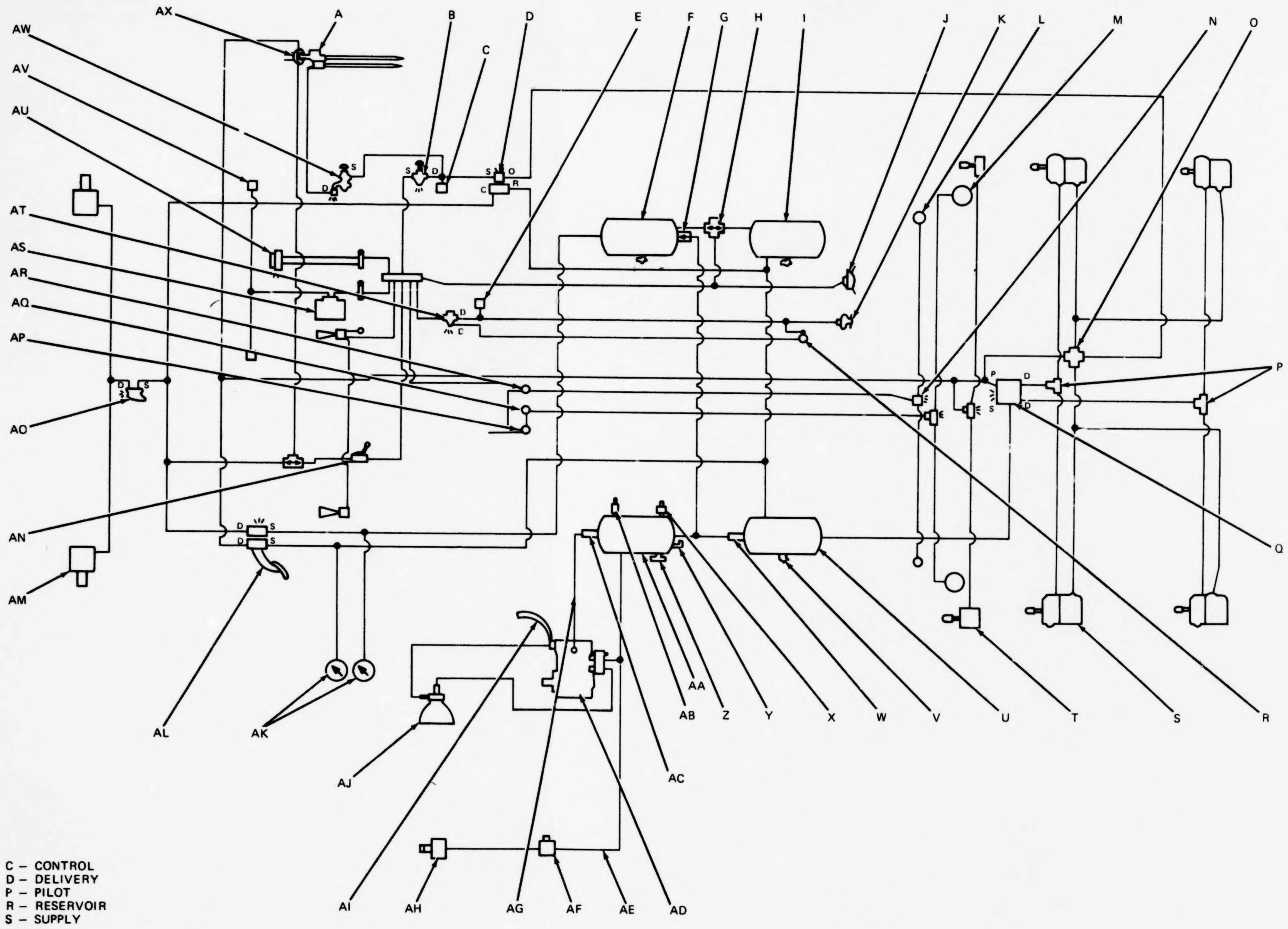

C – CONTROL
D – DELIVERY
P – PILOT
R – RESERVOIR
S – SUPPLY

A	TRACTOR PROTECTION VALVE	Z	AUTOMATIC DRAIN VALVE
B	PARK BRAKE VALVE	AA	SUPPLY RESERVOIR
C	PRESSURE SWITCH – PARK ON	AB	SAFETY VALVE
D	SPRING BRAKE CONTROL VALVE	AC	CHECK VALVE
E	PRESSURE SWITCH – D/L LOCK ON FRONT DRIVE IN	AD	AIR COMPRESSOR
F	SECONDARY RESERVOIR (FRONT)	AE	GOVERNOR LINE
G	CHECK VALVE	AF	THERMOSTAT
H	DOUBLE-CHECK VALVE	AG	DISCHARGE LINE
I	PRIMARY RESERVOIR (REAR)	AH	FAN CLUTCH
J	TRANSMISSION	AI	AIR INLET HOSE
K	DIFFERENTIAL LOCK	AJ	ALCOHOL ASPIRATOR
L	AIR LIFT BELLOW – TYPICAL	AK	AIR GAGES
M	AIR LOBE – TYPICAL	AL	DUAL BRAKE VALVE
N	EXHAUST VALVE	AM	WEDGE CHAMBER – TYPICAL
O	QUICK-RELEASE DOUBLE-CHECK VALVE	AN	HAND CONTROL TRAILER BRAKE
P	QUICK-RELEASE VALVE	AO	RATIO VALVE
Q	RELAY VALVE	AP	REGULATOR
R	TRANSFER CASE	AQ	AIR GAGE
S	SPRING BRAKE CHAMBER – TYPICAL	AR	LIFT SWITCH
T	BRAKE CHAMBER – TYPICAL	AS	WASHER BOTTLE
U	PRIMARY RESERVOIR (REAR)	AT	FRONT AXLE DRIVE SWITCH AND DIFFERENTIAL LOCK
V	MANUAL DRAIN VALVE – TYPICAL	AU	WIPER MOTOR
W	CHECK VALVE	AV	WASHER NOZZLE – TYPICAL
X	LOW PRESSURE	AW	TRAILER SUPPLY VALVE
Y	COUPLER AIR FILL	AX	DOUBLE-CHECK STOPLIGHT

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Figure FO-18. M917 Dump Truck Connecting Schematic Diagram.

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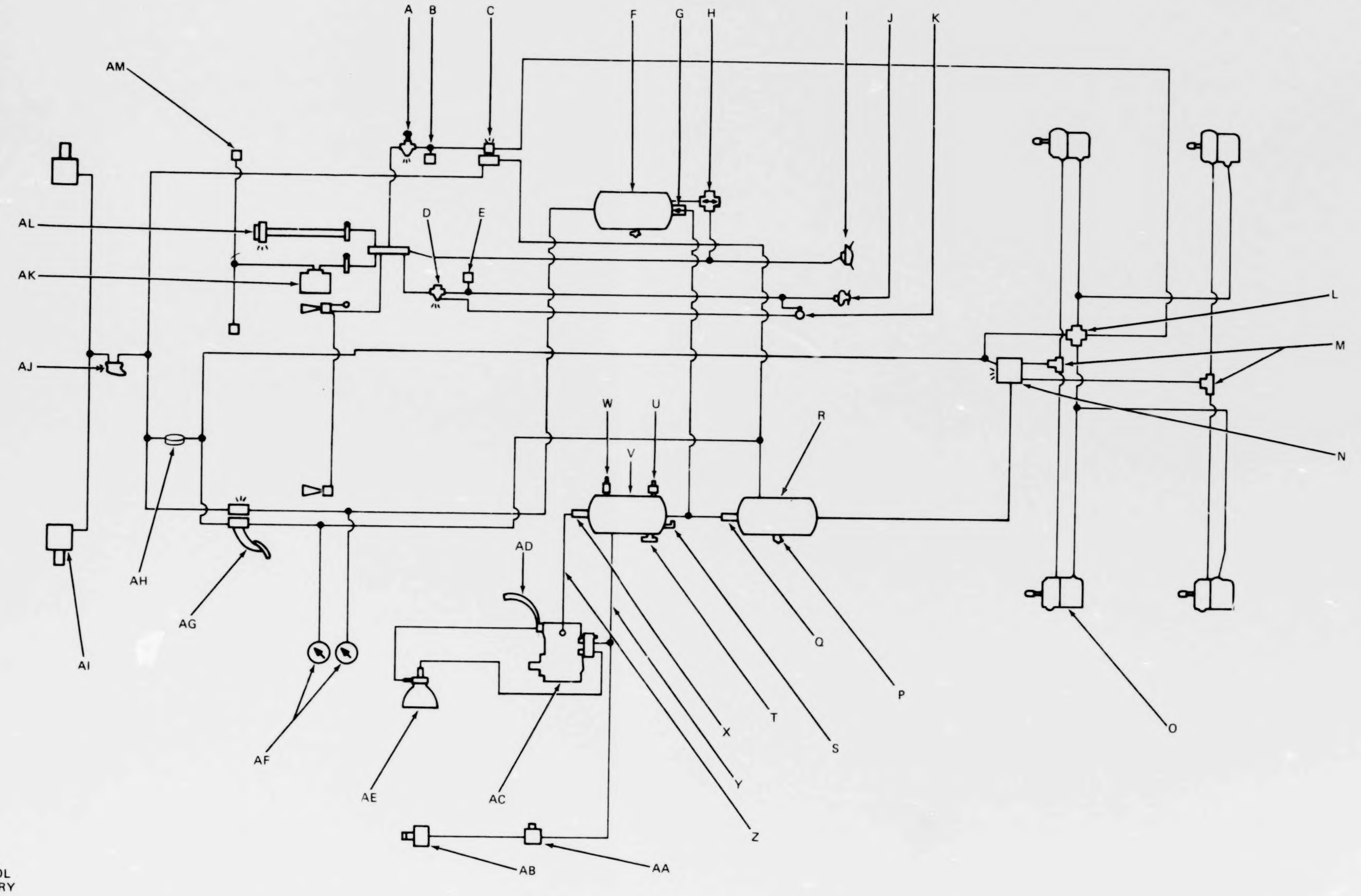

A	PARK BRAKE VALVE
B	PRESSURE SWITCH – PARK ON
C	SPRING BRAKE CONTROL VALVE
D	FRONT AXLE DRIVE SWITCH AND DIFFERENTIAL LOCK
E	PRESSURE SWITCH – D/L LOCK ON FRONT DRIVE IN
F	SECONDARY RESERVOIR (FRONT)
G	CHECK VALVE
H	DOUBLE-CHECK VALVE
I	TRANSMISSION
J	DIFFERENTIAL LOCK
K	TRANSFER CASE
L	QUICK-RELEASE DOUBLE-CHECK VALVE
M	QUICK-RELEASE VALVE
N	RELAY VALVE
O	SPRING BRAKE CHAMBER – TYPICAL
P	MANUAL DRAIN VALVE
Q	CHECK VALVE
R	PRIMARY RESERVOIR (REAR)
S	COUPLER AIR FILL
T	AUTOMATIC DRAIN VALVE
U	LOW PRESSURE
V	SUPPLY RESERVOIR (WET)
W	SAFETY VALVE
X	CHECK VALVE
– Y	GOVERNOR LINE
Z	DISCHARGE LINE
AA	THERMOSTAT
AB	FAN CLUTCH
AC	AIR COMPRESSOR
AD	AIR INLET HOSE
AE	ALCOHOL ASPIRATOR
AF	AIR GAGES
AG	DUAL BRAKE VALVE
AH	DOUBLE-CHECK STOPLIGHT
AI	WEDGE BRAKE AIR CHAMBER – TYPICAL
AJ	RATIO VALVE
AK	WASHER BOTTLE
AL	WIPER MOTOR
AM	WIPER NOZZLE – TYPICAL

C – CONTROL
D – DELIVERY
P – PILOT
R – RESERVOIR
S – SUPPLY

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Figure FO-19. Bituminous Distributor Connecting Schematic Diagram.

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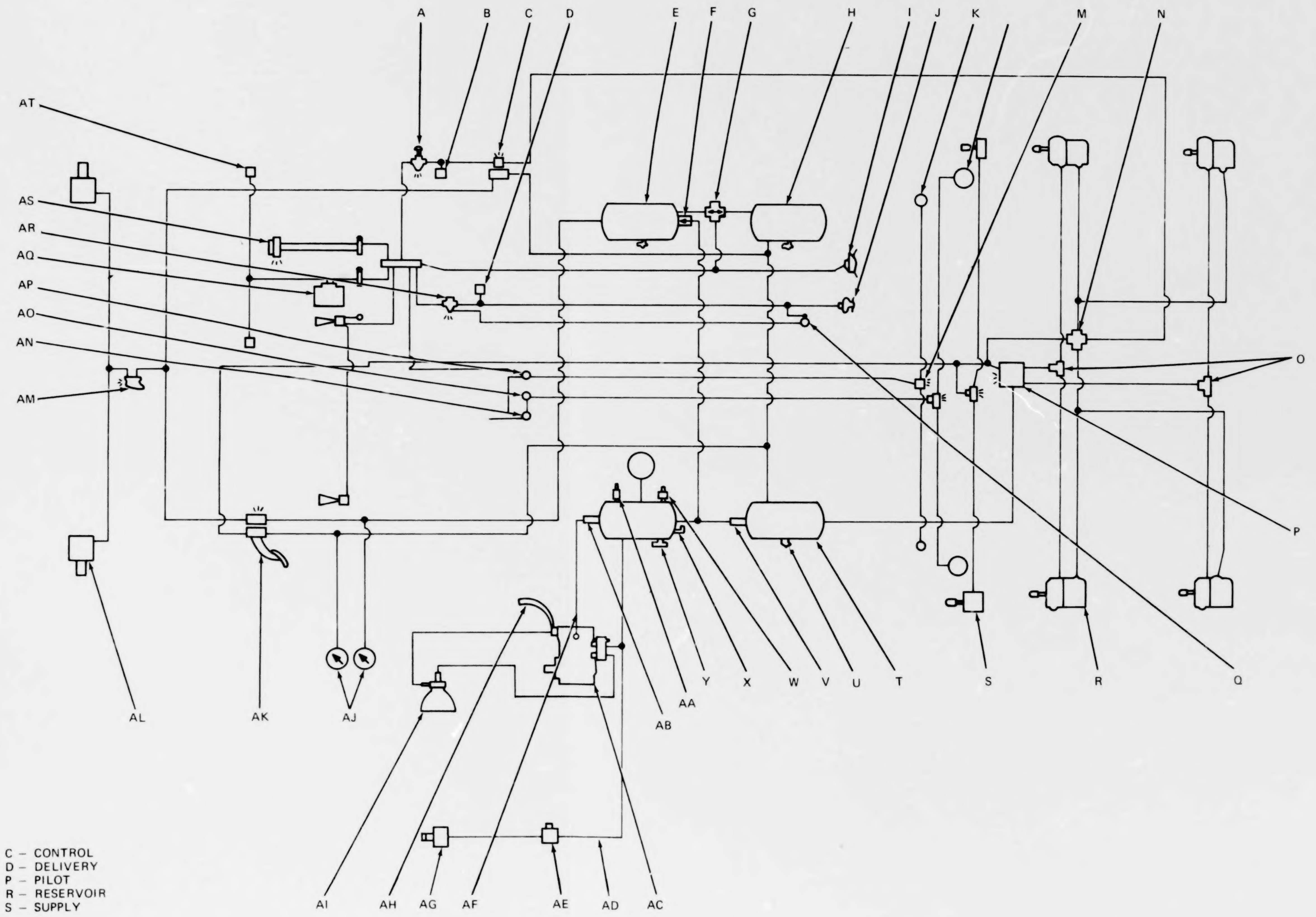

C – CONTROL
D – DELIVERY
P – PILOT
R – RESERVOIR
S – SUPPLY

A	PARK BRAKE VALVE
B	PRESSURE SWITCH – PARK ON
C	SPRING BRAKE CONTROL VALVE
D	PRESSURE SWITCH – D/L LOCK ON FRONT DRIVE IN
E	SECONDARY RESERVOIR (FRONT)
F	CHECK VALVE
G	DOUBLE-CHECK VALVE
H	PRIMARY RESERVOIR (REAR)
I	TRANSMISSION
J	DIFFERENTIAL LOCK
K	AIR LIFT BELLOW – TYPICAL
L	AIR LOBE – TYPICAL
M	EXHAUST VALVE
N	QUICK-RELEASE DOUBLE-CHECK VALVE
O	QUICK-RELEASE VALVE
P	RELAY VALVE
Q	TRANSFER CASE
R	SPRING BRAKE CHAMBER – TYPICAL
S	AIR BRAKE CHAMBER – TYPICAL
T	PRIMARY RESERVOIR (REAR)
U	MANUAL DRAIN VALVE – TYPICAL
V	CHECK VALVE
W	LOW PRESSURE
X	COUPLER AIR FILL
Y	AUTOMATIC DRAIN VALVE
Z	SUPPLY RESERVOIR (WET)
AA	SAFETY VALVE
AB	CHECK VALVE
AC	AIR COMPRESSOR
AD	GOVERNOR LINE
AE	THERMOSTAT
AF	DISCHARGE LINE
AG	FAN CLUTCH
AH	AIR INLET HOSE
AI	ALCOHOL ASPIRATOR
AJ	AIR GAGES
AK	DUAL BRAKE VALVE
AL	WEDGE CHAMBER – TYPICAL
AM	RATIO VALVE
AN	REGULATOR
AO	AIR GAGE
AP	LIFT SWITCH
AQ	WASHER BOTTLE
AR	FRONT AXLE DRIVE SWITCH AND DIFFERENTIAL LOCK
AS	WIPER MOTOR
AT	WASHER NOZZLE – TYPICAL

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Figure FO-20. M919 Concrete Mixer Connecting Schematic Diagram.

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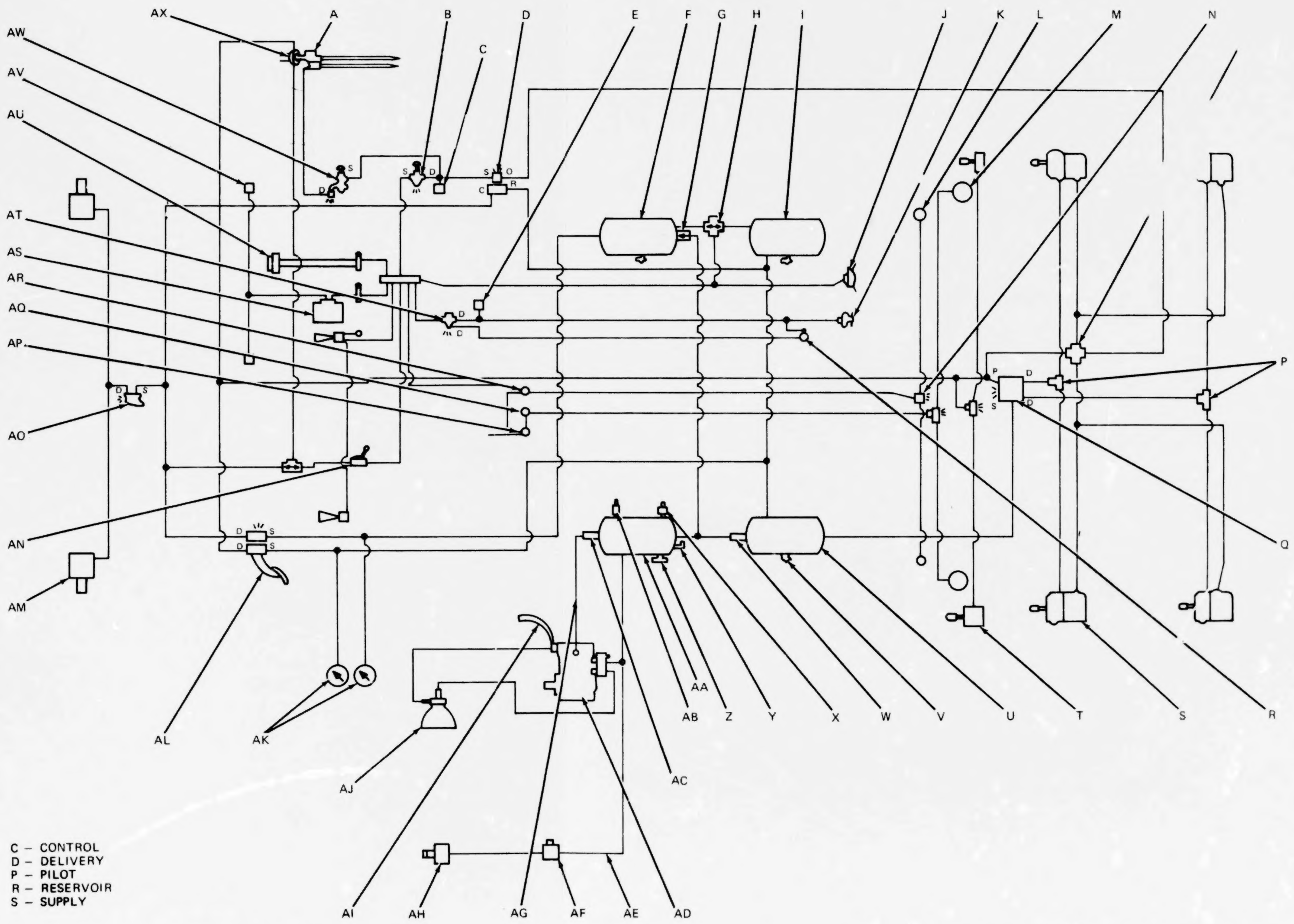

C – CONTROL
D – DELIVERY
P – PILOT
R – RESERVOIR
S – SUPPLY

A	TRACTOR PROTECTION VALVE	Z	AUTOMATIC DRAIN VALVE
B	PARK BRAKE VALVE	AA	SUPPLY RESERVOIR (WET)
C	PRESSURE SWITCH – PARK ON	AB	SAFETY VALVE
D	SPRING BRAKE CONTROL VALVE	AC	CHECK VALVE
E	PRESSURE SWITCH – D/L LOCK ON FRONT DRIVE IN	AD	AIR COMPRESSOR
F	CHECK VALVE	AE	GOVERNOR LINE
G	SECONDARY RESERVOIR (FRONT)	AF	THERMOSTAT
H	DOUBLE CHECK	AG	DISCHARGE LINE
I	PRIMARY RESERVOIR (REAR)	AH	FAN CLUTCH
J	TRANSMISSION	AI	AIR INLET HOSE
K	DIFFERENTIAL LOCK	AJ	ALCOHOL ASPIRATOR
L	AIR LIFT BELLOW – TYPICAL	AK	AIR GAGES
M	AIR LOBE – TYPICAL	AL	DUAL BRAKE VALVE
N	EXHAUST VALVE	AM	WEDGE CHAMBER – TYPICAL
O	QUICK-RELEASE DOUBLE-CHECK VALVE	AN	HAND CONTROL TRAILER BRAKE
P	QUICK-RELEASE VALVE	AO	RATIO VALVE
Q	RELAY VALVE	AP	REGULATOR
R	TRANSFER CASE	AQ	AIR GAGE
S	SPRING BRAKE CHAMBER	AR	LIFT SWITCH
T	BRAKE CHAMBER – TYPICAL	AS	WASHER BOTTLE
U	PRIMARY RESERVOIR (REAR)	AT	FRONT AXLE DRIVE SWITCH AND DIFFERENTIAL LOCK
V	MANUAL DRAIN VALVE – TYPICAL	AU	WIPER MOTOR
W	CHECK VALVE	AV	WASHER NOZZLE – TYPICAL
X	LOW PRESSURE	AW	TRAILER SUPPLY VALVE
Y	COUPLER – AIR FILL	AX	DOUBLE CHECK STOPLIGHT

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Figure FO-21. M920 Tractor Schematic Diagram.

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